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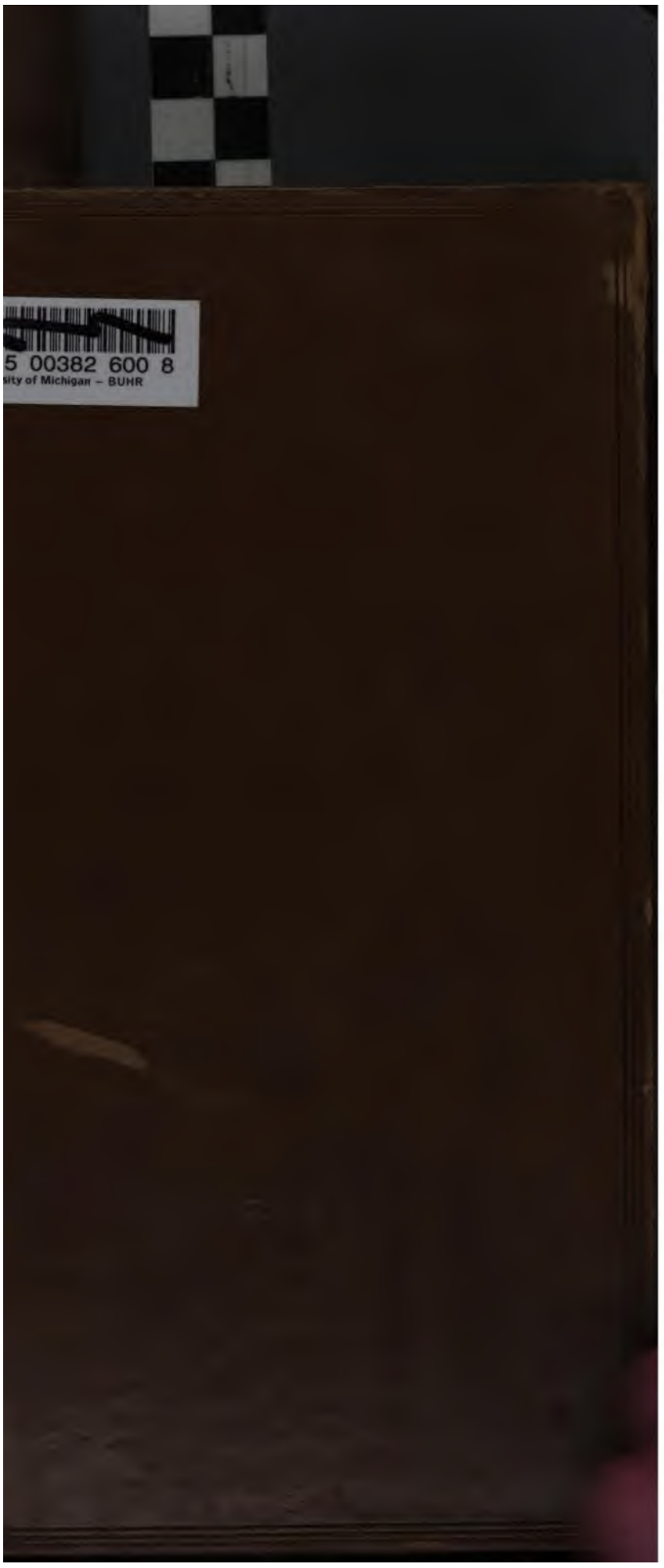
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1850.

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1808. MATTHEW BAILLIE, M.D.
1810. SIR HENRY HALFORD, Bart., M.D. G.C.H.
1813. SIR GILBERT BLANE, Bart., M.D.
1815. HENRY CLINE.
1817. WILLIAM BABINGTON, M.D.
1819. SIR ASTLEY PASTON COOPER, Bart., K.C.H. D.C.L.
1821. JOHN COOKE, M.D.
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1825. GEORGE BIRKBECK, M.D.
1827. BENJAMIN TRAVERS.
1829. PETER MARK ROGET, M.D.
1831. WILLIAM LAWRENCE.
1833. JOHN ELLIOTSON, M.D.
1835. HENRY EARLE.
1837. RICHARD BRIGHT, M.D.
1839. SIR BENJAMIN COLLINS BRODIE, Bart.
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1843. EDWARD STANLEY.
1845. WILLIAM CHAMBERS, M.D. K.C.H.
1847. JAMES MONCRIEFF ARNOTT.
1849. THOMAS ADDISON, M.D.

FELLOWS

OF THE

ROYAL MEDICAL AND CHIRURGICAL SOCIETY OF LONDON.

EXPLANATION OF THE ABBREVIATIONS.

P.—President.	V.P.—Vice-President.
T.—Treasurer.	S.—Secretary.
L.—Librarian.	C.—Member of Council.

AUGUST 1850.

Amongst the non-residents, those marked thus (*) are entitled by composition to receive the Transactions.

Elected

1841 *James Abercrombie, M.D., Cape of Good Hope.

1846 *John Abercrombie, M.D., Physician to the General Dispensary, Cheltenham; Cheltenham.

1847 Elias Acosta, Caraccas; Venzuella.

1842 William Acton, Surgeon to the Islington Dispensary; Queen Anne-street, Cavendish-square.

1818 Walter Adam, M.D., Physician to the Royal Public Dispensary, Edinburgh.

1818 Thomas Addison, M.D., *President;* Physician to, and Lecturer on Medicine at, Guy's Hospital; New-street, Spring-gardens. C. 1826. V.P. 1837. P. 1849.

1814 Joseph Ager, M.D., Great Portland-street. C. 1836.

1819 *James Ainge, Fareham, Hants.

1837 *Ralph Fawcett Ainsworth, M.D., Manchester.

1819 George F. Albert.

1839 Rutherford Alcock, K.C.T. K.T.S., China.

1826 James Alderson, M.D. F.R.S., Berkeley-square. S. 1828. C. 1848. T. 1849.

Elected

1843 C. J. B. ALDIS, M.D., Physician to the London and Surrey Dispensaries, and Lecturer on Medicine at the Hunterian School of Medicine; Chester-terrace, Chester-square.

1850 CHARLES ALEXANDER, Assistant-Surgeon to the Royal Infirmary for Diseases of the Eye; Cork-street.

1813 HENRY ALEXANDER, F.R.S., *Vice-President;* Surgeon-Oculist in Ordinary to the Queen, and Surgeon to the Royal Infirmary for Diseases of the Eye; Cork-street. C. 1840. V.P. 1850.

1836 HENRY ANCELL, Norfolk-crescent, Oxford-square. C. 1847.

1817 ALEXANDER ANDERSON.

1820 THOMAS ANDREWS, M.D. Norfolk, Virginia.

1813 WILLIAM ANKERS, Knutsford.

1819 PROFESSOR ANTOMMARCHI, Florence.

1818 WILLIAM WITHERING ARNOLD, M.D., Physician to the Infirmary and Lunatic Asylum, Leicester.

1825 THOMAS GRAHAM ARNOLD, M.D., Stamford.

1819 JAMES ARNOTT, F.R.S., President of the Royal College of Surgeons of England; New Burlington-street. L. 1826. V.P. 1832. T. 1835. C. 1846. P. 1847.

1817 JOHN ASHBURNER, M.D. M.R.I.A.; Grosvenor-street. C. 1821.

1848 JAMES ATKINS, M.D. F.L.S., Grove House Lunatic Asylum; Stoke Newington-green.

1841 JOHN AVERY, Surgeon to the Charing-cross Hospital; Queen-street, May-fair.

1825 BENJAMIN GUY BABINGTON, M.D. F.R.S., Physician to Guy's Hospital, and Physician to the Deaf and Dumb Institution; George-street, Hanover-square. C. 1829. T. 1848. V.P. 1845.

1846 CORNELIUS METCALFE BABINGTON, Physician to Queen Charlotte's Lying-in Hospital; Hertford-street, May-fair.

1819 JOHN CARR BADELY, M.D., Chelmsford.

1820 *JOHN H. BADLEY, Dudley.

1838 FRANCIS BADGLEY, M.D., Montreal, Upper Canada.

1840 WILLIAM BAINBRIDGE, Upper Tooting.

1836 ANDREW WOOD BAIRD, M.D., Ipswich.

Elected

1816 *William Baker, M.D., Physician to the Derbyshire General Infirmary; Derby.

1839 T. Graham Balfour, M.D., Royal Military Asylum; Chelsea.

1848 Edward Ballard, M.D., East Retford, Notts.

1849 Thomas Ballard, Southwick-place, Hyde-park.

1837 William Baly, M.D. F.R.S., Physician to the Milbank Prison, and Lecturer on Forensic Medicine at St. Bartholomew's Hospital; Queen Anne-street. C. 1845. L. 1847. S. 1848.

1847 Andrew Barclay, M.D., Physician to the Chelsea Dispensary; Curzon-street, May-fair.

1833 Thomas Barker, M.D., Physician to, and Lecturer on Medicine at, St. Thomas's Hospital; Grosvenor-street. C. 1844.

1848 Edgar Barker, Edgware-road.

1843 Thomas Herbert Barker, Priory-terrace, Bedford.

1847 George Barlow, M.D., Physician to Guy's Hospital; Union-street, Southwark.

1849 William Barlow, Resident Medical Officer, Westminster Hospital.

1815 *John Baron, M.D., Cheltenham.

1840 Benjamin Barrow, Ryde, Isle of Wight.

1844 William Basham, M.D., Physician to, and Lecturer on Materia Medica at, the Westminster Hospital; Chester-street, Grosvenor-place.

1836 William Beaumont, Professor of Surgery in the University of King's College; Toronto, Upper Canada.

1841 George Beaman, King-street, Covent-garden.

1840 Charles Beevor, Surgeon to the St. Marylebone Dispensary; Berners-street.

1819 Thomas Bell, F.R.S. L.S. and G.S., Professor of Zoology in King's College, and Lecturer on Diseases of the Teeth at Guy's Hospital; New Broad-street. C. 1832.

1847 Henry Bennet, M.D., Cambridge-square, Hyde-park.

1845 Edwin Unwin Berry, James-street, Covent-garden.

1820 Stephen Bertin, Paris.

1827 William Birch, Barton, Lichfield.

Elected

1845 GOLDING BIRD, M.D. F.R.S., Assistant-Physician to, and Lecturer on Materia Medica at, Guy's Hospital; Russell-square.

1850 JAMES BIRD, M.D., Hyde-park-square.

1849 EDMUND LLOYD BIRKETT. M.D., Cloak-lane, Cheapside.

1846 HUGH BIRT, Morro Velhio, Minas Geraes, Rio Janeiro, Brazil; Surgeon to the Morro Velhio Hospital.

1843 PATRICK BLACK, M.D., Assistant-Physician to St. Bartholomew's Hospital, and Physician to the Seamen's Hospital Ship "Dreadnought;" Bedford-square.

1844 THOMAS BLACKALL, M.D., Physician to the Seamen's Hospital Ship "Dreadnought;" Queen-street, May-fair.

1847 GEORGE C. BLACKMAN, M.D., New York, U.S.

1839 RICHARD BLAGDEN, Surgeon-Accoucheur, and Surgeon Extraordinary to the Queen; Surgeon in Ordinary to Her Royal Highness the Duchess of Kent; Albemarle-street. C. 1847.

1814 THOMAS BLAIR, M.D., Physician to the Sussex County Hospital; Brighton.

1840 PEYTON BLAKISTON, M.D. F.R.S., St. Leonard's-on-Sea.

1845 HENRY BLENKINSOP, Warwick.

1811 *HENRY C. BOISRAGON, M.D., Cheltenham.

1823 LOUIS HENRY BOJANUS, M.D., Wilna.

1816 HUGH BONE, M.D., Inspector-General of Hospitals; Edinburgh.

1810 JOHN BOOTH, M.D., Physician to the General Hospital at Birmingham.

1846 JOHN ASHTON BOSTOCK, Scots Fusilier Guards.

1846 PETER BOSSEY, Thomas-street, Woolwich.

1841 WILLIAM BOWMAN, F.R.S., Professor of Physiology and General Anatomy at King's College, and Assistant-Surgeon to King's College Hospital, and to the Royal Ophthalmic Hospital, Moorfields; Clifford-street.

1849 EDWARD BOWMAN, M.D., Oxford-terrace, Middleton Road, Dalston.

1844 ROBERT BRANDON.

1814 RICHARD BRIGHT, M.D. F.R.S., Physician Extraordinary to the Queen, and Consulting Physician to Guy's Hospital; Savile-row. C. 1821. V.P. 1827. P. 1837.

Elected

1813 Sir Benjamin Collins Brodie, Bart, F.R.S. Serjeant-Surgeon to the Queen, Surgeon in Ordinary to His Royal Highness Prince Albert, Foreign Correspondent of the Institute of France, and Foreign Associate of the Royal Academy of Medicine of Paris; Savile-row. C. 1814. V.P. 1816. P. 1839.

1844 Charles Brooke, B.A. (Cantab.) F.R.S., Keppel-street, Russell-square.

1848 William Philpot Brookes, M.D., Surgeon to the Cheltenham General Hospital and Dispensary, and Visiting Medical Officer to the Cheltenham District of Lunatic Asylums; Albion House, Cheltenham.

1847 George Brown, Grenadier Guards.

1847 *Robert Brown, Winckley-square, Preston, Lancashire.

1842 Charles Blakely Brown, M.B., Physician to Queen Charlotte's Lying-in Hospital, and St. George's and St. James's Dispensary; Hill-street, Berkeley-square.

1818 *Samuel Barwick Bruce, Surgeon to the Forces; Ripon.

M. Pierre Brulatour, Surgeon to the Hospital; Bordeaux.

1823 Bartlet Buchanan, M.D.

1843 Charles Bucknill, M.B., Exminster, Devonshire.

1839 George Budd, M.D. F.R.S., Fellow of Caius College, Cambridge; Professor of Medicine in King's College, London; Physician to King's College Hospital; Dover-street, Piccadilly. C. 1846.

1839 Thomas Henry Burgess, M.D., Half-moon-street, Piccadilly.

1833 George Burrows, M.D. F.R.S. *Vice-President*, Physician to, and Lecturer on Medicine at, St. Bartholomew's Hospital; Cavendish-square. C. 1839. T. 1845. V.P. 1849.

1820 Samuel Burrows.

1837 George Busk, F.R.S., Surgeon to the Seamen's Hospital-ship "Dreadnought;" Croom's Hill, Greenwich. C. 1847.

1850 J. Stevenson Bushnan, M.D., Nottingham-place.

1818 John Butter, M.D. F.R.S. F.L.S, Physician to the Plymouth Eye Infirmary; Plymouth.

1842 Henry Cantis, Maddox-street, Hanover-square.

1847 John Burford Carlill, Berners-street.

Elected

1839 Sir Robert Carswell, M.D., Physician to their Majesties the King and Queen of the Belgians; Brussels.

1825 Harry Carter, M.D., Physician to the Kent and Canterbury Hospital; Canterbury.

1818 Richard Cartwright, Bloomsbury-square.

1820 Samuel Cartwright, F.R.S., Nizell's House, near Tonbridge.

1845 Samuel Cartwright, Jun., Savile-row.

1839 William Cathrow, Weymouth-street.

1845 William Oliver Chalk, Nottingham-terrace, New-road.

1818 Richard Chamberlaine, Kingston, Jamaica.

1816 William Chambers, M.D. K.C.H. F.R.S., Physician to the Queen; Great Cumberland-street. C. 1818. V.P. 1821. P. 1845.

1844 Thomas Chambers, M.D., Hill-street, Berkeley-square.

1837 Henry Chapman, Lower Seymour-street, Portman-square.

1849 Frederick Chapman, Richmond-green, Richmond, Surrey.

1838 George Child, M.D., Consulting Physician to the Westminster General Dispensary; Queen Anne-street.

1849 William Chorley, M.D., Physician to the St. Marylebone Dispensary; South Molton-street.

1842 William Chowne, M.D., Physician to the Charing-cross Hospital; Connaught-place, West, Hyde-park.

1827 Sir James Clark, Bart., M.D. F.R.S., Physician to the Queen, Physician in Ordinary to His Royal Highness Prince Albert, and Consulting Physician to their Majesties the King and Queen of the Belgians; Brook-street. C. 1830. V.P. 1832.

1839 Frederick Le Gros Clark, Assistant-Surgeon to, and Lecturer on Descriptive and Surgical Anatomy at, St. Thomas's Hospital; Consulting Surgeon to the Western General Dispensary; Spring-gardens. S. 1847.

1845 John Clark, M.D., Staff Surgeon, 2d class; West Indies.

1847 Benjamin Clark, Brook-street, Grosvenor-square.

1848 John Clarke, Physician to the British Lying-in Hospital; Clifford-street.

1850 Josiah Clarkson, New Hall-street, Birmingham.

1835 James Clayton, Percy-street, Bedford-square. C. 1850.

Elected

1842 Oscar Clayton, Percy-street, Bedford-square.

1850 Daniel Cohen, M.D., Assistant Physician to St. Thomas's Hospital; Cleveland-row, St. James's.

1835 *William Colborne, Chippenham, Wilts.

1818 Robert Cole, F.L.S., Holybourne, Hampshire.

1828 John Conolly, M.D., Hanwell.

1839 John C. Cooke, M.D., Whitefriars-street, Fleet-street.

1840 *William Robert Cooke, Burford, Oxfordshire.

1840 Bransby Cooper, F.R.S., Surgeon to, and Lecturer on Surgery at, Guy's Hospital; New-street, Spring-gardens. C. 1830. V.P. 1842.

1820 Benjamin Cooper, Stamford.

1819 George Cooper, Brentford.

1841 George Cooper, Surgeon to the Bloomsbury Dispensary; Woburn-place, Russell-square.

1843 William White Cooper, Senior Surgeon to the North London Eye Infirmary, and to the Honorable Artillery Company; Berkeley-square.

1841 Holmes Coote, Demonstrator of Anatomy at St. Bartholomew's Hospital; Robert-street, Adelphi.

1835 George Copeland, Cheltenham.

1822 James Copland, M.D. F.R.S., Consulting Physician to Queen Charlotte's Lying-in Hospital; Old Burlington-street. C. 1830. V.P. 1838.

1847 John Rose Cormack, M.D., Putney, Surrey.

1839 *Charles C. Corsellis, M.D., Resident Physician to the Lunatic Asylum, Wakefield.

1814 *William Cother, Surgeon to the Infirmary, Gloucester.

1847 Richard Cotton, M.D., Assistant-Physician to the Hospital for Consumption and Diseases of the Chest; Bolton-street, Piccadilly.

1828 William Coulson, Surgeon to the Magdalen Hospital, Consulting Surgeon to the City Lying-in Hospital; Frederick's-place, Old Jewry. C. 1831. L. 1832.

1817 *Sir Philip Crampton, Bart. F.R.S., Surgeon-General to the Forces in Ireland.

1841 Mervyn Crawford, M.D., Physician to, and Lecturer on Medicine at, the Middlesex Hospital; Upper Berkeley-street, Portman-square.

Elected

1822 Sir Alexander Crichton, M.D. F.R.S. and F.L.S., Physician in Ordinary to their Imperial Majesties the Emperor and Dowager Empress of all the Russias. C. 1823.

1847 George Critchett, Assistant-Surgeon to the London Hospital, and the Royal London Ophthalmic Hospital; Finsbury-square.

1837 John Farrar Crookes, Russell-square.

1849 *William Edward Crowfoot, Beccles, Suffolk.

1818 William Cuming, M.D., Professor of Botany at the Glasgow Institution, and Surgeon to the Royal Infirmary at Glasgow.

1837 Thomas Blizard Curling, F.R.S., Surgeon to, and Lecturer on Surgery at, the London Hospital; New Broad-street. S. 1845. C. 1850.

1846 Henry Curling, Ramsgate.

1847 Edmund Currey, M.D., Lismore, Ireland.

1836 George Cursham, M.D., Physician to the Hospital for Consumption and Diseases of the Chest, and to the Female Orphan Asylum; Savile-row. S. 1842. C. 1850.

1822 Christopher John Cusack.

1828 Adolphe Dalmas, M.D., Paris.

1840 John Dalrymple, F.R.S., Consulting Surgeon to the London Ophthalmic Hospital; Grosvenor-street. C. 1848.

1836 *James S. Daniel, Ramsgate.

1850 John Bamfylde Daniell, M.D., Grosvenor-street.

1820 George Darling, M.D., Russell-square. C. 1841.

1818 *Sir Francis Sacheverel Darwin, Knt. M.D., Breadsall Priory, near Derby.

1848 Henry Daubeny, Manchester-square.

1818 Henry Davies, M.D., Physician to the British Lying-in Hospital, Physician-Accoucheur to the Marylebone General Dispensary; Savile-row. C. 1827. V.P. 1848.

1846 Frederick Davies, Upper Gower-street, Bedford-square.

1847 John Davies, M.D., Physician to the Hertford Infirmary, and Visiting Physician to the County Gaol and Lunatic Asylum, Hertford.

1820 Thomas Davis, Brook-street, Hanover-square. C. 1843.

1818 James Dawson, Liverpool.

Elected

1847 GEORGE DAY, M.D. F.R.S., Chandos Professor of Medicine, St. Andrew's.

1841 CAMPBELL DE MORGAN, Surgeon to, and Lecturer on Anatomy at, the Middlesex Hospital; Upper Seymour-street, Portman-square.

1846 *SAMUEL BEST DENTON, Ivy-lodge, Hornsea, East Riding, Yorkshire.

1844 ROBERT DICKSON, M.D., Hertford-street, May-fair.

1839 JAMES DIXON, *Librarian*, Assistant-Surgeon to St. Thomas's Hospital, and Surgeon to the Royal London Ophthalmic Hospital; Broad-street-buildings. L. 1849.

1845 JOHN DODD, Bryanston-street, Portman-square.

1839 HENRY PYE-LEWIS DREW, Gower-street, Bedford-square.

1846 JOHN DRUMMOND, Deputy Inspector of Fleets and Hospitals; Royal Naval Hospital, Woolwich.

1843 THOMAS DRURY, M.D., Physician to the Salop Infirmary; Shrewsbury.

1845 GEORGE DUFF, M.D., Genoa.

1845 EDWARD DUFFIN, Langham-place, Portland-place.

1833 ROBERT DUNN, Norfolk-street, Strand. C. 1845.

1843 C. M. DURRANT, M.D., Physician to the East Suffolk and Ipswich Hospital; Ipswich.

1839 HENRY DYER, M.D., Bryanston-square.

1836 J. W. EARLE, Cheltenham.

1824 GEORGE EDWARDS.

1823 C. C. EGERTON, India.

1838 THOMAS ELLIOTSON, M.D., Clapham.

1848 GEORGE VINER ELLIS, jun., Professor of Anatomy in University College, London; Albert-street, Regent's-park.

1835 WILLIAM ENGLAND, M.D., Wisbeach.

1842 JOHN ERICHSEN, Professor of Surgery in University College, and Surgeon to University College Hospital; Welbeck-street, Cavendish-square.

1815 G. F. D. EVANS, M.D., High-street, Bedford. C. 1838.

1836 GEORGE EVANS, M.B., Physician to the Birmingham Hospital.

1845 WILLIAM JULIAN EVANS, M.D.

Elected

1841 Sir James Eyre, M.D., Physician-Accoucheur to St. George's and St. James's Dispensary; Brook-street, Grosvenor-square.

1844 Arthur Farre, M.D. F.R.S., Professor of Midwifery in King's College, London; Curzon-street, May-fair.

1831 Robert Ferguson, M.D., Physician-Accoucheur to the Queen, Physician to the Westminster Lying-in Hospital; Park-street, Grosvenor-square. C. 1839. V.P. 1847.

1841 William Fergusson, F.R.S., Professor of Surgery in King's College, London; Surgeon to King's College Hospital, and to H.R.H. Prince Albert; George-street, Hanover-square. C. 1849.

1850 *Frederick Field, Birmingham.

1849 George Fincham, M.D., Physician to the Western Dispensary; Chapel-street, Belgrave-square.

1836 John Fisher, Surgeon-in-Chief to the Metropolitan Police Force; Upper Grosvenor-street. C. 1843.

1838 George Lionel Fitzmaurice, Gloucester-place, Portman-square.

1842 Thomas Fletcher, M.D., Physician to the General Dispensary, Birmingham.

1841 John Forbes, M.D., F.R.S., Physician to her Majesty's Household; Old Burlington-street.

1848 John Gregory Forbes, Devonport-street, Hyde-park.

1817 *Robert T. Forster, Southwell.

1820 Thomas Forster, M.D., Hartfield-lodge, East Grinsted.

1846 Algernon Frampton, M.D., Physician to the London Hospital; New Broad-street.

1816 John Francis, M.D., Professor of Materia Medica in the University of New York.

1841 August. Franz, M.D., Royal German Spa, Brighton.

1843 Patrick Fraser, M.D., Assistant-Physician to the London Hospital; Guildford-street, Russell-square.

1846 Joseph Freeman, Spring-gardens.

1836 John French, Surgeon to St. James's Infirmary; Great Marlborough-street.

1849 Robert Temple Frere, Physician-Accoucheur to, and Lecturer on Midwifery at, the Middlesex Hospital; Queen-street, May-fair.

Elected

1846 HENRY FULLER, M.B., Assistant-Physician to, and Lecturer on Medical Jurisprudence at, St. George's Hospital; Manchester-square.

1815 *GEORGE FREDERICK FURNIVAL, Egham.

1819 JOHN SAMUEL GASKOIN, Clarges-street. C. 1836.

1819 HENRY GAULTER.

1848 JOHN GAY, Surgeon to the Royal Free Hospital; Finsbury-place, Finsbury-square.

1821 *RICHARD FRANCIS GEORGE, Surgeon to the Bath Hospital.

1841 J. DURANCE GEORGE, F.G.S., Lecturer on Dental Surgery at University College, and Dental Surgeon to University College Hospital; Old Burlington street.

1812 GEORGE GOLDIE, M.D., York.

1818 JAMES ALEXANDER GORDON, M.D. F.R.S. C. 1828. V.P. 1829.

1844 JOHN GRANTHAM, Crayford, Kent.

1850 HENRY GRAY, Wilton-street, Grosvenor-place.

1846 GEORGE GREAM, M.D., Hertford-street, May-fair.

1816 JOSEPH HENRY GREEN, F.R.S., Surgeon to, and Lecturer on Surgery at, St. Thomas's Hospital; Hadley, Middlesex. C. 1820. V.P. 1830.

1841 GEORGE GREGORY, M.D., Physician to the Smallpox Hospital; Camden-square, Camden New-town. S. 1825. C. 1849.

1843 ROBERT GREENHALGH, Upper Charlotte-street, Fitzroy-square.

1814 JOHN GROVE, M.D., Salisbury.

1849 WILLIAM GULL, M.D., Guy's Hospital.

1837 JAMES MANBY GULLY, M.D., Holyrood-house, Great Malvern.

1819 JOHN GUNNING, C.B., Inspector of Hospitals; Paris.

1842 CHARLES GUTHRIE, Assistant-Surgeon to the Westminster Hospital, and to the Westminster Ophthalmic Hospital, Pall-Mall.

1849 HAMMETT HAILEY, Newport Pagnel, Bucks.

1827 MARSHALL HALL, M.D. F.R.S., Grosvenor-street. L. 1828. C. 1840. V.P. 1843.

1842 *GEORGE HALL, M.D.

1845 JOHN HALL, M.D., Deputy Inspector-General of Hospitals; Cape of Good Hope.

1848 ALEXANDER HALLEY, M.D., Wimpole-street, Cavendish-square.

Elected

1819 THOMAS HAMMERTON, Piccadilly. C. 1829.

1838 HENRY HANCOCK, Surgeon to the Charing-cross Hospital; Harley-street.

1849 *RICHARD JAMES HANSARD, Broad-street, Oxford.

1848 *GEORGE HARCOURT, M.D., Chertsey, Surrey.

1836 J. F. HARDING, 6, Mylne-street, Myddelton-square.

1843 THOMAS HARRISON, M.D. F.L.S., Garston-lodge, Somersetshire.

1846 JOHN HARRISON, the Court-yard, Albany.

1841 WILLIAM HARVEY, Surgeon to the Royal Dispensary for Diseases of the Ear, and to the Freemasons' Female Charity; Soho-square.

1816 *JOHN HAVILAND, M.D., Regius Professor of Physic in the University of Cambridge, Physician to Addenbrooke's Hospital, Cambridge.

1828 CÆSAR HAWKINS, Surgeon to St. George's Hospital; Grosvenor-street. C. 1830. V.P. 1838. T. 1841.

1838 CHARLES HAWKINS, *Secretary;* Savile-row. C. 1846. S. 1850.

1848 THOMAS HAWKSLEY, Margaret-street, Cavendish-square.

1820 THOMAS EMERSON HEADLAM, M.D., Newcastle-upon-Tyne.

1848 JAMES HEALE, M.D., Physician to the Royal Free Hospital; Westbourne-crescent, Hyde-park.

1850 GEORGE HEATON, M.D., Boston, U.S.

1828 THOMAS HEBERDEN, M.D., Upper Brook-street.

1844 JOHN HENNEN, M.D., *Librarian;* Physician to the Western General Dispensary; Upper Southwick-street, Hyde-park. L. 1848.

1848 MITCHELL HENRY, Assistant-Surgeon to the Middlesex Hospital; Harley-street, Cavendish-square.

1849 AMOS HENRIQUES, Upper Berkeley-street, Portman-square.

1821 VINCENT HERBERSKI, M.D., Professor of Medicine in the University of Wilna.

1843 PRESCOTT GARDNER HEWETT, Assistant-Surgeon to St. George's Hospital, Lecturer on Anatomy at St. George's Hospital Medical School; Hertford-street, May-fair.

1841 *NATHANIEL HIGHMORE, Consulting-Surgeon to the Weymouth and Dorsetshire Eye Infirmary; Sherborne.

1814 *WILLIAM HILL, Wooton-under-Edge.

Elected

1842 WILLIAM HILLMAN, Lecturer on Anatomy and Physiology at the Westminster Hospital, Surgeon to the Farringdon General Dispensary; Argyll-street, Regent-street.

1841 JOHN HILTON, F.R.S., Surgeon to, and Lecturer on Anatomy at, Guy's Hospital; New Broad-street.

1848 MARTIN THOMAS HISCOX, M.D., Bath, Somerset.

1840 THMOAS HODGKIN, M.D., Bedford-square. C. 1842.

1813 JOSEPH HODGSON, F.R.S., Westbourne-terrace, Hyde-park. C. 1817.

1835 THOMAS HOLBERTON, Hampton.

1843 LUTHER HOLDEN, Ely-place, Holborn.

1814 HENRY HOLLAND, M.D. F.R.S., Physician Extraordinary to the Queen, and Physician in Ordinary to H.R.H. Prince Albert; Brook-street. C. 1817. V.P. 1826.

1846 BARNARD HOLT, Surgeon to the Westminster Hospital; Parliament-street.

1846 CARSTEN HOLTHOUSE, Surgeon to the Public Dispensary, Lincoln's Inn; Lecturer on Anatomy and Physiology; Serle-street, Lincoln's-inn-fields.

1819 *JOHN HOWELL, M.D. F.R.S. ED.; Clifton.

1828 *EDWARD HOWELL, M.D., Swansea.

1844 EDWIN HUMBY, Windsor-terrace, Maida-hill.

1822 ROBERT HUME, M.D. C.B., Inspector of Hospitals; Commissioner in Lunacy; Curzon-street. V.P. 1836.

1840 HENRY HUNT, M.D., Brook-street, Hanover-square.

1842 CHRISTOPHER HUNTER, Downham, Norfolk.

1849 EDWARD LAW HUSSEY, Surgeon to the Radcliffe Infirmary, Oxford.

1820 WILLIAM HUTCHINSON, M.D.

1840 CHARLES HUTTON, M.D., Physician to the Royal Infirmary for Children; Lowndes-street, Belgrave-square.

1848 GEORGE COCKBURN HYDE, Montpelier-square, Brompton.

1838 WILLIAM IFIL, M.D.

1847 WILLIAM EDMUND IMAGE, Surgeon to the Suffolk General Hospital; Bury St. Edmund's.

1826 WILLIAM INGRAM, Midhurst.

1839 A. R. JACKSON, M.D., Warley Barracks, Essex.

Elected

1845 *Henry Jackson, Surgeon to the Sheffield General Infirmary; St. James's-row, Sheffield.

1841 Paul Jackson, Thayer-street, Manchester-square.

1847 Thomas Reynolds Jackson, Charles-street, St. James's.

1841 Maximilian Jacobovicz, M.D., Pesth.

1825 John B. James, M.D.

1847 *William Withall James, Exeter, Devon.

1844 Samuel Jeafferson, M.D., Leamington.

1839 Julius Jeffreys, F.R.S.

1840 *G. Samuel Jenks, M.D., Brighton.

1848 Athol Johnson, Lecturer on Physiology at St. George's Hospital Medical School; and Surgeon to St. George's and St. James's Dispensary; Old Bond Street.

1821 Edward Johnson, M.D., Weymouth.

1847 George Johnson, M.D., Assistant-Physician to King's College Hospital; King's College, Strand.

1837 Henry Charles Johnson, Assistant-Surgeon to, and Lecturer on Medical Jurisprudence at, St. George's Hospital; Savile-row. C. 1850.

1844 John Johnston, Dover-street, Piccadilly.

1844 Henry Bence Jones, M.D. F.R.S., Physician to St. George's Hospital; Lower Grosvenor-street.

1835 H. D. Jones, Soho-square.

1837 T. W. Jones, M.D., Finsbury-pavement, Finsbury-square.

1829 *George Julius, Richmond.

1816 *George Hermann Kauffmann, M.D., Hanover.

1815 Robert Keate, Serjeant-Surgeon to the Queen, Surgeon to H.R.H. the Duchess of Gloucester, and to St. George's Hospital; Hertford-street, May-fair. C. 1818. V.P. 1826.

1848 *Daniel Kendell, M.D., St. John's, Wakefield, Yorkshire.

1847 Alfred Keyser, Norfolk-crescent, Oxford-square.

1839 *David King, M.D., Eltham.

1836 P. Nugent Kingston, M.D., Physician to the Westminster Hospital; Curzon-street, May-fair. C. 1846.

1806 James Laird, M.D.

1840 Samuel Lane, Surgeon to the Lock Hospital, and Lecturer on Anatomy; Grosvenor-place. C. 1849.

Elected

1841 *Charles Lashmar, M.D., Croydon, Surrey.

1816 G. E. Lawrence.

1810 William Lawrence, F.R.S., Surgeon Extraordinary to the Queen; Surgeon to St. Bartholomew's Hospital, and to Bridewell and Bethlem Hospitals; Lecturer on Surgery at St. Bartholomew's Hospital; Whitehall-place. S. 1813. V. P. 1818. C. 1820. T. 1821. P. 1831.

1840 Thomas Laycock, M.D., York.

*Jesse Leach, Heywood, near Bury, Lancashire.

1823 John G. Leath, M.D.

1822 John Ledsam, Surgeon to the Birmingham Eye Infirmary.

1822 Robert Lee, M.D. F.R.S., Physician to the British Lying-in Hospital; Physician-Accoucheur to the St. Marylebone Infirmary; and Lecturer on Midwifery at St. George's Hospital; Savile-row. C. 1829. S. 1830. V. P. 1835.

1823 Henry Lee, M.D., Keppel-street, Russell-square. C. 1837. S. 1839.

1843 Henry Lee, Assistant-Surgeon to King's College Hospital, and to the Lock Hospital; Dover-street.

1846 Thomas Safford Lee, Cambridge.

1836 Frederick Leighton, M.D.

1847 John Lever, M.D., Physician-Accoucheur to Guy's Hospital; Wellington-street, Borough.

1847 Sir John Liddell, M.D. F.R.S. C.B., Inspector of Hospitals; Royal Hospital, Greenwich.

1806 John Lind, M.D.

1845 William Little, M.D., Physician to, and Lecturer on Medicine at, the London Hospital; Finsbury-square.

1819 Robert Lloyd, M.D.

1824 Eusebius Arthur Lloyd, Surgeon to St. Bartholomew's Hospital and Christ's Hospital; Bedford-row. S. 1827. V. P. 1838. C. 1843.

1820 J. G. Locher, M.C.D., Town Physician of Zurich.

1844 Edward Lonsdale, Assistant-Surgeon to the Orthopædic Hospital; Montague-street, Russell-square.

Elected

1824 CHARLES LOCOCK, M.D., First Physician-Accoucheur to the Queen, and Consulting Physician to the General Lying-in Hospital; Hertford-street, May-fair. C. 1826. V.P. 1841.

1846 HENRY THOMAS LOMAX, Stafford.

1836 JOSEPH S. LÖWENFELD, M.D., Berbice.

1815 *PETER LUARD, M.D.

1814 SIR JAMES MACGRIGOR, Bart., M.D. K.C.B. K.T.S. LL.D. F.R.S., Director-General of the Medical Department of the Army; Harley-street, Cavendish-square. C. 1820. V.P. 1815.

1823 GEORGE MACILWAIN, Consulting Surgeon to the Finsbury Dispensary; The Court-Yard, Albany. C. 1829. V.P. 1848.

1818 W. MACKENZIE, Surgeon to the Eye Infirmary, Glasgow.

1822 RICHARD MACKINTOSH, M.D.

1847 HENRY JOHN M'DOUGALL, Henrietta-street, Cavendish-square.

1846 WILLIAM M'EWEN, M.D., Surgeon to the Cheshire County Gaol, and House-Surgeon to the Chester General Infirmary; Newgate-street, Chester.

1839 WILLIAM MACINTYRE, M.D., Harley-street. C. 1850.

1848 FREDERICK MACKENZIE, M.D., Chester-place, Hyde-park-square.

1844 DANIEL MACLACHLAN, M.D., Physician to the Royal Hospital, Chelsea, and Deputy Inspector-General of Hospitals.

1849 D. MACLOUGHLIN, M.D., Chapel-place, Cavendish-square.

1849 DUNCAN MACLURE, Harley-street.

1842 JOHN MACNAUGHT, M.D., Bedford-street, Liverpool.

1835 D. C. MACREIGHT, M.D., St. Hillier's, Jersey.

1837 A. M. M'WHINNIE, Lecturer on Comparative Anatomy at St. Bartholomew's Hospital; Bridge-street, Blackfriars.

1848 WILLIAM MARKHAM, M.D., Cork-street, Bond-street.

1824 SIR HENRY MARSH, Bart., M.D., Dublin.

1838 THOMAS PARR MARSH, M.D., Physician to the Salop Infirmary, Shrewsbury.

1840 JOHN MARSTON, Gloucester-gardens, Hyde-park.

1841 JAMES RANALD MARTIN, F.R.S., Lower-Grosvenor-street.

Elected

1819 *John Masfen, Surgeon to the County General Infirmary, and Fever Hospital, Stafford.

1849 George Bellasis Masfen, Stafford.

1818 J. P. Maunoir, Professor of Surgery at Geneva.

1820 Herbert Mayo, F.R.S. S. 1825. V.P. 1834.

1837 Thomas Mayo, M.D. F.R.S., Physician to the St. Marylebone Infirmary; Wimpole-street. S. 1841. C. 1847.

1839 R. H. Meade, Bradford, Yorkshire.

1819 *Thomas Medhurst, Hurstbourne Tarrant.

1837 S. W. J. Merriman, M.D., Physician to the Royal Infirmary for Children, Consulting Physician to the Westminster General Dispensary, and Assistant-Physician to the West London Lying-in Institution; Brook-street.

1847 Edward Meryon, M.D. (Lond.), Clarges-street, Piccadilly.

1815 Augustus Meyer, M.D., St. Petersburg.

1840 Richard Middlemore, Surgeon to the Eye Infirmary, Birmingham.

1847 James Miller, M.D., Welbeck-street, Cavendish-square.

1818 *Patrick Miller, M.D. F.R.S. Ed., Physician to the Devon and Exeter Hospitals, and to the Lunatic Asylum; Exeter.

1848 Gavin Milroy, M.D., Fitzroy-square.

1844 Nathaniel Montefiore, Great Stanhope-street, Park-lane.

1828 Joseph Moore, M.D., Physician to the Royal Freemasons' Female Charity; Consulting Physician to Queen Charlotte's Lying-in Hospital; Savile-row. C. 1837.

1836 George Moore, M.D., Hastings.

1848 Charles Hewitt Moore, Surgeon to the Middlesex Hospital; Mortimer-street, Cavendish-square.

1814 *George Frederick Muhry, M.D., Hanover.

1847 Simon Murchison, Chester-terrace, Chester-square.

1841 Edward William Murphy, M.D., Professor of Midwifery in University College; Henrietta-street, Cavendish-square.

1845 Thomas D. Mutter, M.D., Professor of Surgery in Jefferson Medical College; Philadelphia.

1840 Robert Nairne, M.D., Physician to, and Lecturer on Medicine, at St. George's Hospital; Charles-street, Berkeley-square. C. 1848.

1835 Thomas Nelson, M.D., George-street, Portman-square.

Elected

1843 EDWARD NEWTON, Howland-street, Fitzroy-square.

1816 THOMAS NIXON (Army).

1819 *GEORGE NORMAN, Surgeon to the United Hospital and Puerperal Charity; Bath.

1849 HENRY BURFORD NORMAN, Surgeon to the St. Marylebone Dispensary, and to the Western Ophthalmic Institution; Duchess-street, Portland-place.

1845 HENRY NORRIS, South Petherton, Somerset.

1829 JOHN NORTH, Gloucester-place. C. 1835.

1849 *ARTHUR NOVERE, Great Stanmore, Middlesex.

1847 *WILLIAM NOURSE, Santry-house, Dublin.

1843 WILLIAM O'CONNOR, George-street, Portman-square.

1847 THOMAS O'CONNOR, March, Cambridgeshire.

1846 FRANCIS ODLING, Devonshire-street, Portland-place.

1822 JAMES OGLE, M.D. F.R.S., Clinical and Aldrichian Professor of Medicine, Oxford; and Senior Physician to the Radcliffe Infirmary.

1842 WILLIAM PIERS ORMEROD.

1846 *EDWARD LATHAM ORMEROD, M.D., Old Steyne, Brighton.

1847 WILLIAM PAGE, M.D., Physician to, and Lecturer on Medicine at, St. George's Hospital; Curzon-street, May-fair.

1847 *WILLIAM BOUSFIELD PAGE, Surgeon to the Cumberland Infirmary; Carlisle.

1840 JAMES PAGET, Assistant-Surgeon to, and Lecturer on General and Morbid Anatomy and Physiology, and Warden of the Collegiate Establishment at, St. Bartholomew's Hospital. C. 1848.

1806 *ROBERT PALEY, M.D., Bishopston-grange, near Ripon, Yorkshire.

1836 J. W. LANGSTON PARKER, Birmingham.

1847 NICHOLAS PARKER, M.B., Microscopical Demonstrator of Morbid Anatomy at the London Hospital School of Medicine; Finsbury-square.

1841 JOHN PARKIN, M.D., Thurloe-place, Brompton.

1828 RICHARD PARTRIDGE, F.R.S., Surgeon to King's College Hospital, and Professor of Anatomy in King's College, London; New-street, Spring-gardens. S. 1832. C. 1837. V.P. 1847.

Elected

1819 GRANVILLE SHARP PATTISON, New York.

1845 THOMAS PEACOCK, M.D., Assistant-Physician to St. Thomas's Hospital; Finsbury-circus.

1830 CHARLES PELCHIN, M.D., St. Petersburgh.

1819 JOHN PEREGRINE, M.D., Jersey.

1839 THOMAS PEREGRINE, M.D., Half-moon-street.

1831 JONATHAN PEREIRA, M.D. F.R.S. F.L.S., Assistant-Physician to, and Lecturer on Materia Medica at, the London Hospital; Finsbury-square. C. 1844. V.P. 1847.

1844 WILLIAM PETTIGREW, Chester-street, Grosvenor-place.

1814 *EDWARD PHILLIPS, M.D., Physician to the County Hospital; Winchester.

1837 BENJAMIN PHILLIPS, F.R.S., *Treasurer;* Surgeon to, and Lecturer on Surgery at, the Westminster Hospital; Wimpole-street. L. 1841. T. 1847.

1848 EDWARD PHILLIPS, M.D., Coventry.

1846 FRANCIS PHILP, M.D., Physician to St. Luke's Hospital; Grosvenor-street.

1836 ISAAC PIDDUCK, M.D., Montague-street, Russell-square.

1841 HENRY PITMAN, M.D., Assistant-Physician to, and Lecturer on Materia Medica at, St. George's Hospital; Montague-place, Russell-square.

1850 ALFRED POLAND, Assistant-Surgeon to Guy's Hospital, and to the Royal Ophthalmic Hospital; St. Thomas's-street.

1845 GEORGE DAVID POLLOCK, Surgeon to the North London Eye-Infirmary, and Lecturer on Anatomy at St. George's Hospital Medical School; Grosvenor-street.

1843 CHARLES POPE, M.D. M.A. F.L.S., Temple Cloud, near Bristol.

1846 JEPHSON POTTER, M.D. F.L.S., Oxford-road, Manchester.

1840 LEWIS POWELL, John-street, Berkeley-square.

1842 JAMES POWELL, M.B. (Lond.), Great Coram-street, Brunswick-square.

1839 JOHN PROPERT, New Cavendish-street.

1845 JOHN PYLE, Surgeon to the North London Eye-Infirmary; Oxford-terrace, Hyde-park.

Elected

1816 Sir William Pym, M.D., Inspector of Hospitals.

1830 Jones Quain, M.D., Paris.

1835 Richard Quain, F.R.S., Surgeon to University College Hospital, and Professor of Clinical Surgery and of Anatomy in University College; Keppel-street. C. 1838. L. 1846.

1807 John Ramsey, M.D., Physician to the Infirmary at Newcastle.

1821 Henry Reeder, M.D., Ridge House, Chipping, Sudbury.

1835 G. Regnoli, Professor of Surgery in the University of Pisa.

1842 David Boswell Reid, M.D., House of Commons.

1846 James Reid, M.D., Physician to the Infirmary of St. Giles and Bloomsbury; General Lying-in Hospital, &c.; Brook-street.

1847 Samuel Richards, M.D., Bedford-square.

1829 Sir John Richardson, M.D. F.R.S. C.B., Surgeon to the Naval Hospital; Chatham.

1849 William Richardson, Radnor-place, Hyde-park.

1843 Joseph Ridge, M.D., Dorset-square.

1845 Benjamin Ridge, M.D., Putney, Surrey.

1821 Charles Roberts, M.D., Physician to the Adult Deaf and Dumb and Welsh Charity; New Bridge-street. C. 1827.

1829 *Archibald Robertson, M.D. F.R.S. L. and Ed., Physician to the General Infirmary, Northampton.

1843 George Robinson, M.D., Newcastle-on-Tyne.

1843 William Roden, M.D. F.L.S., Kidderminster.

1835 George Hamilton Roe, M.D., Physician to, and Lecturer on Medicine at, the Westminster Hospital; Upper Brook-street, Grosvenor-square. C. 1841.

1836 Arnold Rogers, Hanover-square.

1846 William Rogers, M.D., Berners-street.

1819 Henry Roots, M.D., Consulting-Physician to St. Thomas's Hospital; Russell-square. C. 1833. V.P. 1834.

1829 Sudlow Roots, Twickenham, Middlesex.

1836 Richard Roscoe, M.D.

Elected

1835 *Caleb Rose, Swaffam.

1850 Archibald Colquhoun Ross, M.D., Madeira.

1849 Henry Routh, M.D., Dorset-square.

1845 Henry Mortimer Rowdon, Baker-street, Portman-square.

1841 Richard Rowland, M.D., Physician to the Bloomsbury Dispensary; Woburn-place, Russell-square.

1836 James Russell, Birmingham.

1845 James Russell, jun., Birmingham.

1827 *Thomas Salter, F.L.S., Poole.

1844 *Thomas Salter, M.D. F.L.S., Ryde, Isle of Wight.

1842 George Sampson, Chester-street, Belgrave-square.

1849 Hugh Sanderson, Upper Berkeley-street, Portman-square.

1847 William Sankey, M.B. (Lond.), London Fever Hospital; Liverpool-road, Islington.

1845 Edwin Saunders, Surgeon-Dentist to the Queen, and Lecturer on Diseases of the Teeth at St. Thomas's Hospital; George-street, Hanover-square.

1834 Ludwig Sauvan, M.D., Warsaw.

1840 Augustin Sayer, M.D., Upper Seymour-street.

1824 Edward Seymour, M.D. F.R.S., Charles-street, Berkeley-square. C. 1826. S. 1827. V.P. 1830.

1840 William Sharp, F.R.S. F.G.S. F.R.A.S., Rugby.

1837 William Sharpey, M.D. F.R.S. L. and Ed., Professor of Anatomy and Physiology in University College, London; Gloucester-crescent, Regent's-park. C. 1848.

1836 Alexander Shaw, Surgeon to the, and Lecturer on Surgery at, Middlesex Hospital; Henrietta-street, Cavendish-square. C. 1842. S. 1843.

1848 *Edward Shearman, M.D., Rotherham, Yorkshire.

1849 Francis Sibson, M.D. F.R.S., Brook-street, Grosvenor-square.

1848 Edward Henry Sieveking, M.D., Bentinck-street.

1839 Thomas Silvester, M.D., High-street, Clapham.

1842 John Simon, F.R.S., Lecturer on Pathology at St. Thomas's Hospital; Lancaster-place, Strand.

1821 Charles Skene, M.D., Professor of Anatomy and Surgery; Marischal College, Aberdeen.

Elected

1827 GEORGE SKENE, Bedford.

1824 FREDERICK SKEY, F.R.S., Assistant-Surgeon to, and Lecturer on Anatomy at, St. Bartholomew's Hospital; Surgeon to the Northern Dispensary; Grosvenor-street. C. 1828. L. 1829. V.P. 1841.

1810 NOEL THOMAS SMITH, M.D., Newcastle.

1835 JOHN GREGORY SMITH, Harewood, Yorkshire.

1838 HENRY SMITH, Upper Seymour-street, Portman-square.

1845 WILLIAM SMITH, Park-street, Bristol.

1847 WILLIAM SMITH, M.D., Weymouth, Dorsetshire.

1843 ROBERT WILLIAM SMITH, M.D. M.R.I.A., Professor of Surgery in the University of Dublin; Surgeon to the Richmond Hospital; Dublin.

1843 JOHN SNOW, M.D., Frith-street, Soho-square.

1819 *GEORGE SNOWDEN, Ramsgate.

1816 *JOHN SMITH SODEN, Sunbury, Middlesex.

1830 SAMUEL SOLLY, F.R.S., *Vice-President;* Senior Assistant-Surgeon to St, Thomas's Hospital; St. Helen's-place. L. 1838. C. 1845. V.P. 1849.

1844 FREDERICK SPACKMAN, M.B., Harpenden, St. Alban's.

1834 JAMES SPARK, Newcastle.

1843 *STEPHEN SPRANGER, Grantham, Lincolnshire.

1838 GEORGE JAMES SQUIBB, Orchard-street.

1835 RICHARD STAFFORD, Surgeon to the St. Marylebone Infirmary; Old Burlington-street. C. 1840.

1815 EDWARD STANLEY, F.R.S., Surgeon to St. Bartholomew's Hospital; Brook-street. C. 1821. S. 1824. V.P. 1827. T. 1832. P. 1843.

1842 ALEXANDER STEWART, M.D., Assistant-Physician to, and Lecturer on Materia Medica at, the Middlesex Hospital; Grosvenor-street.

1839 THOMAS STONE, M.D.

1843 ROBERT REEVE STORKS.

1844 JOHN SOPER STREETER, Harpur-street, Red Lion-square.

1827 WILLIAM STROUD, M.D., Great Coram-street. C. 1831.

1847 WILLIAM ALLEN SUMNER, Surgeon to the Portland Town Free Dispensary; Abbey-road, St. John's Wood.

Elected

1839 ALEXANDER JOHN SUTHERLAND, M.D. F.R.S., Physician to St. Luke's Hospital; Parliament-street. C. 1350.

1842 JAMES SYME, Professor of Clinical Surgery in the University of Edinburgh; Charlotte-square, Edinburgh.

1844 RICHARD TAMPLIN, Surgeon to the Orthopædic Hospital; Old Burlington-street.

1848 THOMAS TANNER, M.D., Physician to the Farringdon Dispensary; Charlotte-street, Bedford-square.

1840 THOMAS TATUM, Surgeon to, and Lecturer on Surgery at, St. George's Hospital; George-street, Hanover-square.

1835 JOHN TAUNTON, Surgeon to the City of London Truss Society, and to the City Dispensary; Hatton-garden. C. 1840.

1845 *JOHN TAYLOR, M.D., Physician to the Infirmary; Huddersfield.

1845 THOMAS TAYLOR, Vere-street, Cavendish-square.

1817 FREDERICK THACKERAY, M.D., Physician to Addenbrooke's Hospital, Cambridge.

1845 EVAN THOMAS, Pwllheli, North Wales.

1839 SETH THOMPSON, M.D., *Secretary;* Physician to, and Lecturer on Medicine at, the Middlesex Hospital; Lower Seymour-street. C. 1849. S. 1850.

1842 THEOPHILUS THOMPSON, M.D. F.R.S., Physician to the Northern Dispensary, and to the Hospital for Consumption and Diseases of the Chest; Bedford-square.

1835 FREDERICK HALE THOMSON, Berners-street.

1819 JOHN THOMSON, M.D. F.L.S., *Vice-President;* Physician to the Finsbury Dispensary; Pullin's-place, High-street, Islington. C. 1833. L. 1834. V.P. 1850.

1836 JOHN THURNAM, M.D., The Retreat, York.

1848 EDWARD TILT, M.D., Physician to the Farringdon Dispensary; York-street, Portman-square.

1834 ROBERT BENTLEY TODD, M.D. F.R.S., *Treasurer;* Physician to King's College Hospital, Professor of Physiology and of General and Morbid Anatomy in King's College; New-street, Spring-gardens. L. 1842. T. 1850.

1828 JAMES TORRIE, M.D., Aberdeen.

1843 JOSEPH TOYNBEE, F.R.S., Surgeon to the St. George's and St. James's Dispensary; Savile-row.

Elected

1850 SAMUEL TRACY, Surgeon-Dentist to St. Bartholomew's and Christ's Hospitals; Finsbury-place, Finsbury-square.

1808 BENJAMIN TRAVERS, F.R.S., Surgeon Extraordinary to the Queen; Surgeon in Ordinary to His Royal Highness Prince Albert; Bruton-street. C. 1810. V.P. 1817. P. 1827.

1821 *WILLIAM TRAVERS, M.D., Scarborough.

1841 MATTHEW TRUMAN, M.D., Gloucester-place, Kentish-town.

1835 JOHN CUSSON TURNER, M.D., Brighton.

1845 THOMAS TURNER, Surgeon to the Royal Manchester Infirmary, and Lecturer on Anatomy; Mosley-street, Manchester.

1819 BARNARD VAN OVEN, Consulting Surgeon to the Charity for Delivering Jewish Lying-in Women; Gower-street, Bedford-square.

1806 BOWYER VAUX, Surgeon to the General Hospital, Birmingham.

1839 WILLIAM VICKERS, Baker-street.

1814 JOHN PAINTER VINCENT, Lincoln's-inn-fields. C. 1823. V.P. 1837.

1810 JAMES VOSE, M.D.

1846 ALEXANDER URE, Surgeon to the Westminster General Dispensary; Bloomsbury-square.

1828 BENEDETTO VULPES, M.D., Physician to the Hospital of Aversa, and to the Hospital of Incurables, Naples.

1841 ROBERT WADE, Surgeon to the Westminster General Dispensary; Dean-street, Soho.

1823 WILLIAM WAGNER, M.D., Berlin.

1820 THOMAS WALKER, M.D., Physician to the Forces; Lower Seymour-street.

1821 TILLEARD WARD, York-place, Portman-square.

1845 T. OGIER WARD, M.D., Leonard-place, Kensington.

1846 NATHANIEL WARD, Assistant-Surgeon to, and Demonstrator of Anatomy at, the London Hospital; Broad-street-buildings.

1814 MARTIN WARE, Russell-square. C. 1844. T. 1846.

1811 JOHN WARE.

1846 JAMES WARE, Surgeon to the Finsbury Dispensary; and to the Convalescent Institution, Russell-square.

1816 *CHARLES BRUCE WARNER, Cirencester.

Elected

1829 E. T. WARRY, Lyndhurst.

1837 THOMAS WATSON, M.D., Henrietta-street, Cavendish-square. C. 1840. V.P. 1845.

1847 *THOMAS WATSON, Holbeach, Lincolnshire.

1840 WILLIAM WEBB, Gislingham, near Thwaite, Suffolk.

1842 FREDERICK WEBER, M.D., Physician to the St. George's and St. James's Dispensary; Norfolk-street, Park-lane.

1835 JOHN WEBSTER, M.D. F.R.S., Consulting Physician to the St. George's and St. James's Dispensary; Brook-street. C. 1843.

1844 WILLIAM WEGG, M.D., Physician to the St. George's and St. James's Dispensary; Maddox-street, Hanover-square.

1842 CHARLES WEST, M.D., Lecturer on Midwifery at St. Bartholomew's Hospital; Wimpole-street, Cavendish-square.

1841 THOMAS WEST, M.D. F.L.S., Daventry.

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1828 JOHN WHATLEY, M.D.

1849 JOHN WHITE, The Albany, Piccadilly.

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1844 FREDERICK WILDBORE, High-street, Shoreditch.

1837 G. A. F. WILKS, M.D., Temple-walk, Matlock, Derbyshire.

1840 C. J. B. WILLIAMS, M.D. F.R.S., Holles-street. C. 1849.

1829 ROBERT WILLIS, M.D., Barnes. L. 1838.

1831 *W. J. WILSON, Surgeon to the Manchester Infirmary.

1839 ERASMUS WILSON, F.R.S., Consulting Surgeon to the St. Pancras Infirmary; Henrietta-street, Cavendish-square.

1839 JAMES ARTHUR WILSON, M.D., Physician to St. George's Hospital; Dover-street. C. 1846.

1825 THOMAS A. WISE, India.

1850 *ROBERT STANTON WISE, M.D., Banbury, Oxon.

1841 GEORGE LEIGHTON WOOD, Surgeon to the Bath Hospital; Queen-square, Bath.

1848 WILLIAM WOOD, M.D., Resident Medical Officer, Bethlem Hospital.

1843 JOHN WOODFALL, M.D., Assistant-Physician to the Westminster Hospital; Davies-street, Berkeley-square.

Elected

1847 ROBERT WOOLLASTON, Conduit-street, Westbourne-terrace.

1833 THOMAS WORMALD, Assistant-Surgeon to St. Bartholomew's Hospital; Bedford-row. C. 1839.

1842 WILLIAM WORTHINGTON, Surgeon to the Infirmary, Lowestoft, Suffolk.

1848 EDWARD WRIGHT, Kennington-row, Kennington.

[It is particularly requested, that any change of Title or Residence may be communicated to the Secretaries before the 1st of August in each year, in order that the List may be made as correct as possible.]

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Elected

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1835 Sir David Brewster, K.H. LL.D. F.R.S. L. and Ed. &c., Cor. Mem. Institute of France, &c.; Kingussie.

1841 Robert Brown, D.C.L. F.R.S., Vice-President of the Linnean Society; British Museum.

1835 The Very Rev. William Buckland, D.D. F.R.S., Dean of Westminster.

1847 Edwin Chadwick, Commissioner of the Board of Health.

1835 Michael Faraday, D.C.L. F.R.S., Cor. Memb. Institute of France; Royal Institution.

1841 Sir John Frederick William Herschel, Bart., D.C.L. F.R.S., President of the Royal Astronomical Society; Somerset-House.

1835 Sir William J. Hooker, LL.D. F.R.S. L. and Ed., Royal Botanic Garden, Kew.

1847 Richard Owen, F.R.S., Cor. Memb. Institute of France; Hunterian Professor to, and Curator of the Museum of, the Royal College of Surgeons of England.

1850 Richard Phillips, Esq., F.R.S.

1835 The Rev. A. Sedgwick, A.M. F.R.S. &c., Woodwardian Lecturer, Cambridge.

1841 The Rev. William Whewell, D.D. F.R.S., Master of Trinity College, Cambridge.

FOREIGN HONORARY FELLOWS.

(Limited to Twenty-four.)

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1841 G. Andral, M.D., Professor in the Faculty of Medicine; Paris.

1815 Paolo Assalini, M.D., Professor of Surgery, and Chief Surgeon to the Military Hospital at Milan, &c.

1835 Carl Johan Eckström, K.P.S. and W., Physician to the King of Sweden, First Surgeon to the Seraphim Hospital, Stockholm.

1835 W. J. Edwards, M.D. F.R.S., Member of the Institute of France; Paris.

1841 Christian Gottfried Ehrenberg, Berlin.

1835 Baron A. de Humboldt, Member of the Institute of France, &c.; Berlin.

1841 James Jackson, M.D., Professor of Medicine in the University of Cambridge, Boston, U.S.

1843 Baron Justus Liebig, M.D. F.R.S., Professor of Chemistry in the University of Giessen, &c.

1841 P. C. A. Louis, M.D., Physician to the Hôtel-Dieu, Member of the Royal Academy of Medicine, &c.; Paris.

1841 F. Magendie, M.D., Member of the Institute; Physician to the Hospital of the Salpêtrière; Paris.

1847 Professor Matteucci, University of Pisa.

1841 Johann Muller, M.D., Professor of Anatomy and Physiology, and Director of the Royal Anatomical Museum; Berlin.

1835 J. C. Oersted, M.D., Professor of Physics in the University of Copenhagen, &c. &c.

1835 Professor Orfila, Dean of the Faculty, &c. &c., Paris.

1841 Bartolomeo Panizza, M.D., Pavia.

1850 Carl Rokitansky, M.D., Curator of the Imperial Pathological Museum at the University of Vienna, &c. &c.

1843 Philibert Joseph Roux, Member of the French Institute; Surgeon in Chief of the Hôtel-Dieu; Professor in the Faculty of Medicine; Paris.

1835 C. J. Timminck, Director of the Museum of Natural History of the King of Holland; Amsterdam.

1835 Frederick Tiedemann, M.D., Professor of Anatomy and Physiology; Heidelberg.

1841 John C. Warren, M.D., Professor of Anatomy and Surgery in the University of Cambridge, Boston, U.S.

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THE Council of the Royal Medical and Chirurgical Society deems it proper to state, that the Society does not hold itself in any way responsible for the statements, reasonings, or opinions set forth in the various papers, which, on grounds of general merit, are thought worthy of being published in its Transactions.

CASE OF A FOREIGN BODY

IMPACTED IN THE ORIFICE

OF THE

THIRD BRANCH OF THE RIGHT BRONCHUS:

WITH REMARKS.

BY

JOHN GREGORY FORBES,

FELLOW OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND;
SURGEON TO THE WESTERN GENERAL DISPENSARY.

Received September 2d.—Read November 13th, 1849.

THE propriety of attempting the removal of a foreign body, when impacted in a bronchial tube, is a point in surgery upon which much difference of opinion prevails. On the one hand it is alleged, that the introduction of instruments within the air-passages is a difficult and dangerous proceeding; that there is much uncertainty, from the irritation to which they give rise, whether they can be successfully employed; and that as, in some instances, the offending substance has been loosened and ejected, it is more prudent not to interfere;—on the other it is urged, that if the natural powers fail in effecting so desirable a result, as its early expulsion from its situation, the symptoms which follow are usually so formidable, and the life of the patient is placed in such jeopardy, that in the absence of any special circumstances forbidding an operation, its extraction should be attempted.

However just the former opinion may be, it is unquestionable that the grounds upon which the latter is founded are so true, that it becomes a matter of the utmost importance

to decide the question. For this purpose, more extended experience, derived from individual cases, is necessary, as the only means of determining whether the dangers resulting from the efforts made to extract the foreign body, are greater than those to which the patient is exposed if it is allowed to remain undisturbed in its position, and the powers of Nature are trusted to for its expulsion. It is with this view that I venture to bring before the Society a case which has recently occurred at the Western General Dispensary.

The symptoms induced by the impaction of a foreign body in a bronchial tube differ materially from those which arise when it moves up and down in the air-passages during the act of respiration. In the latter case, the continued laryngeal irritation gives rise to repeated attacks of convulsive cough and threatened suffocation; in the former, these are not observed, but the symptoms are then referable to the impediment offered to the ingress and egress of the air on one side of the chest, to which succeed inflammation of the bronchial membrane, and of the parenchymatous tissue of the lung, entirely, or in part, and sometimes of the pleura itself.[1]

It is not my purpose, however, to enter into details of the symptoms occurring in such cases, which have been ably described in the writings of Porter, Stokes, and others; but I may briefly refer to the relative fatality which attends this accident when no surgical relief has been attempted, to the practicability of the operation, and to the success which has followed its accomplishment.

The fatality which ensues from a foreign body remaining in the air-passages, led Mr. Porter to remark, "that if not removed, it tends, sooner or later, to the one inevitable consequence—the destruction of the patient."[2] In looking over, however, the histories of published cases in which it was fixed in a bronchus, we find that in a small pro-

[1] Craigie's Pathological Anatomy, 2d edit., 1848, p. 589.

[2] Porter on the Surgical Pathology of the Larynx and Trachea, 1837, p. 190.

portion it was coughed out without having produced any very serious and irremediable mischief,[1] and a rare case is recorded by Royer Collard,[2] in which no thoracic disease appeared to have been induced. The patient, a lunatic in the Maison de Charenton, swallowed a piece of mutton bone. It gave rise to no symptoms indicative of affection of the respiratory organs, and on examining his body six years afterwards, no lesion whatever of the lungs or air-passages was discovered, though it was fixed in the bronchial tubes. Another case[3] is given by the same author, in which a nail remained in a bronchial tube, it was supposed, for two or three years, without the occurrence of any symptoms. The patient, however, died at last with cough, expectoration, and fever, after an illness of a fortnight. The nail was found in the left bronchus, partially oxidized, the lung was filled with tubercles, for the most part softened, and the bronchial membrane was thickened. In other cases on record, inflammation and suppuration took place, by which the foreign body was loosened and expelled, and even under this complication some patients recovered.[4] But such favorable results cannot be anticipated with any confidence. In by far the larger proportion of cases of this description which have been recorded, much suffering was endured, severe pulmonary inflammation was set up, and though life was in some instances prolonged for several years, the patients at last succumbed, worn out by the continued irritation and hectic, before or shortly after they were unburdened of the cause of their misery.[5]

[1] Browne on Tracheotomy; Edin. Med. and Surg. Journal, vol. xxx, p. 290.

[2] Nouvelle Bibliothèque Médicale, vol. i, Feb. 1826, pp. 196-200.

[3] Ibid.

[4] Browne on Tracheotomy. A case, by Mr. Nunn, in Prov. Med. and Surg. Journal, July 25, 1849, in which a "puff dart" had been fixed in the left bronchus, and was ejected with a quart of pus. Case by Mr. Travers, jun., in Med.-Chirurg. Transactions, vol. xxiii, 1840. Case by Dr. Craigie, in his Pathological Anatomy, 1848, p. 590.

[5] Browne on Tracheotomy; Craigie's Pathological Anatomy, 1848, p. 589.

In considering the question of opening the trachea, with the view of seizing the foreign body with forceps, and extracting it, many circumstances call for attention. When of small size and light weight, with a smooth surface and soft texture, it is less likely to cause inflammation, and there is more probability of its being coughed out, than if it happens to be of an opposite nature. Thus peas and beans, though lodged in a bronchus, may cause but little irritation, and, if dislodged, may rapidly traverse the trachea and larynx in a column of air during coughing, without causing much inconvenience; but it is far less probable, that a piece of bone, when impacted in the same situation, can be got rid of so readily. Its rough surface and irregular shape, besides lessening the probability of its being loosened, render it liable to be arrested in its transit, when instant suffocation might be the consequence.

The nature of the offending substance, then, forms a very necessary inquiry before determining upon the operation, no less than the age of the patient, and the previous state of his health. In young children, the small size and delicate structure of the parts to be interfered with, may prevent the possibility of its being effected; and in older persons, who have suffered from diseased lungs or other exhausting maladies, the prospect of a successful issue may be so slight as to forbid such a proceeding. Neither of these objections, however, apply to the case of a healthy adult; and it may be well, therefore, to endeavour, without delay, to rid him of such a fruitful source of danger.

In support of the practicability of the operation, it is sufficient to refer to the two cases mentioned by the late Mr. Liston, in his 'Practical Surgery,'—the only instances, as far as I am aware, on record, in which it was successfully accomplished. In the one, a piece of mutton bone was removed by himself from the right bronchus of a woman 37 years of age, six months after the occurrence of the accident; and in the other, a bell-button was extracted by Mr. Dickin, of Middleton, from the same situation, in a boy 8 years of age, ten days after its entrance. In neither case

was the proceeding attended with much difficulty, and the patients recovered.[1]

We have, however, high authority for stating that, in some cases, serious and insurmountable obstacles do present themselves to the completion of the operation. In the case recorded by Sir Benjamin Brodie, in the 26th volume of the Transactions of this Society, though attempts were made on two separate occasions to extract a coin from the right bronchus, through an opening in the trachea, the convulsive cough was so great on the introduction of the forceps, that it could not be felt, and it became necessary to desist. The same occurred in a case lately published by Mr. Solly,[2] and a similar one is mentioned by Mr. Porter, as having occurred in the person of a boy 5 years of age, in whose right bronchus a bean had lodged. Several attempts were made to remove it, but without success. The presence of the forceps in the trachea produced the most intense distress, and the operation was abandoned. The bean was afterwards moved by a probe, and coughed out through the wound.[3]

Another argument which may be brought forward against the operation, is the difficulty of determining the exact position of the foreign body. This is undoubtedly attended with much uncertainty, and it becomes a matter of great moment to decide the question as to the nature of the evidence upon which the attempt to extract it would be justified. The auscultatory signs, though open to fallacy from the existence of previous disease in the lungs, are the chief guides. In the case now to be related, a persistent expiratory sound, at first a "cooing rhonchus," and degenerating into a peculiar "whiff" or "puff," heard most clearly over the right bronchus, together with the pain experienced in that situation, and the consequent voluntary efforts made by the patient to expel it from thence, were the symptoms

[1] Liston's Practical Surgery, 4th edit., chap. xi.

[2] Medical Times, vol. xix, p. 557.

[3] Porter on the Surgical Pathology of the Larynx and Trachea, 1837, p. 218.

upon which the chief reliance was placed as indicative of its presence.

Supposing, then, the diagnosis to be as clearly established as it can be under such circumstances, and from the alleged nature of the foreign body, there is small probability of its being ejected, I cannot help feeling that an early attempt might be made to extract it by the usual mode. Although on the first trial it may not be possible to seize or even to feel it, a second may be more successful, and if it cannot be extracted, it may be displaced sufficiently to allow of its expulsion, as occurred in Mr. Porter's case already quoted. But suppose, as has happened, every effort to remove it should fail, further experience is wanted to prove that the operation itself is attended with that amount of risk which would warrant the surgeon in depriving the patient of the prospect which it affords of immediate and, most probably, permanent relief. It is the opinion of Sir Benjamin Brodie, that under all circumstances the trachea should be opened,[1] and Dr. Mason Warren, of Boston, states, "that if a case of the kind occurred to him, he should at once perform the operation of tracheotomy, and by a free use of ether, attempt to allay the irritability of the air-passages, so as to allow a more easy exploration by instruments than is generally afforded in the natural state." He admits at the same time, that the judgment of the surgeon must be determined by the circumstances of the particular case.[2]

I feel, however, considerable diffidence in advocating the operation in the presence of those so much better entitled to form a just opinion of its merits, and who, from the difficulties which attend the diagnosis, the irritation produced by the forceps, the injury which may be inflicted by them, and the uncertainty of being able to grasp and extract the foreign body, deem it more prudent to abstain from surgical interference.

Case.—Mrs. W., æt. 46, of pale complexion and thin

[1] Med.-Chirurg. Transactions, vol. xxvi, p. 297.

[2] Vide Boston Medical and Surgical Journal, Dec. 1847.

person, applied at the Western General Dispensary on the 11th of May, 1849, stating that on the previous day, at 2 p.m., whilst eating some broth, a piece of solid matter, which she believed to have been "bone covered with gristle," passed into the windpipe. She was immediately seized with spasmodic cough and threatened suffocation; "her face became black, and water ran from her mouth," and it was some minutes before she recovered herself. She fancied that at first she felt it sticking across the windpipe, but that she squeezed it lower down with her fingers. Soon after the accident happened, a probang was passed into the stomach, but no obstruction was found.

The following was her state at 2 p.m. on the 11th of May. —Her voice was hoarse, the respiratory movements were slow (not averaging more than 10 or 12 per minute), and accompanied with a wheezing noise; and she was distressed by a constant short cough, aggravated by full inspiration. There was pain at the upper part of the chest, which she referred to the junction of the second rib with the sternum, and at the back of the neck. Pulse 84; tongue rather furred. The expression was somewhat anxious, but there was no lividity or suffusion of the face. The symptoms were increased by exertion, or by lying on the right side. There had been no shivering, nor any return of the suffocative cough.

On ausculting the chest, a marked difference was found to exist between the two sides. On the right, the breath-sound was obscured, the natural vesicular murmur being scarcely perceptible, and a "prolonged and peculiar rhonchus" was heard throughout the lung, but most distinctly over the point to which the pain was referred, and was more audibly marked during expiration. On the left side the respiratory sounds were feeble, but free from rhonchus, and both inspiration and expiration were lengthened.

An inquiry into the previous state of her health, elicited that she had been subject to "pain in the right side, and to tightness in the chest;" but that she had never suffered from cough or expectoration.

These symptoms, and the previous history of the case, led my colleagues, Dr. M'Intyre, Dr. Hennen, and Dr. Miller, to agree with me in opinion as to the presence of a foreign body in the air-passages, and that its probable situation was in or near the right bronchus.

Eight leeches were applied to the chest, and a saline mixture with antimony ordered to be taken at intervals.

On the 12th, the report was that she had passed a restless night from constant hacking, dry cough, which was immediately brought on by any effort. The pain had been relieved by the leeches, which bled freely. She had no sickness or dysphagia.

On carefully examining the chest, the right side was observed to rise less during inspiration than the left; the respiratory sounds were audible, though still obscured; and posteriorly there was some dullness on percussion, whilst under the clavicle the usual clear sound was elicited. Some wheezing sounds were present, and expiration was attended with a "snoring rhonchus," which varied somewhat in character at different times.

In the evening she had a severe shivering fit, which lasted an hour and a half, followed by heat of skin and pain in the back. At half-past seven the pulse was 114, easily compressed. The tongue was dryish, and she complained of some thirst. The sound with expiration had now more of a "cooing" character.

13th. She slept three hours in the night. Slight expectoration of frothy mucus free from odour, and not tinged by blood. Complains of some pricking pains under the left clavicle, and in the right hypochondrium. Pulse 96. Skin cool. No lividity of countenance. She is sensible that the "cooing sound" proceeds from the right side of the chest, and she makes continual efforts, by coughing, to remove the bone, which she believes to be situated in the same situation to which she first referred the pain. She was threatened with another shivering fit in the evening, but kept it off by hot bottles applied to the feet. Some tincture of hyoscyamus was substituted for the antimony in her saline mixture.

14th. Slept three hours, but awoke with tickling in the throat, owing, she thinks, to accumulation of mucus. The cough has been incessant, with mucus expectoration. Pulse 108. The auscultatory signs the same. In the afternoon she was visited by Dr. M'Intyre, Mr. Arnott, Mr. Anderson, and myself. We then found that since the morning she had been more tranquil, that the wheezing and dyspnœa were less, though her respirations were 40 per minute, that the expectoration was moderate, and, upon the whole, that she was less distressed. This favorable change led to the supposition that the foreign body might have somewhat altered its position, so as to cause less irritation, and to offer less obstruction to the respiration. On the following grounds it was agreed that the operation should not then be performed, though the possibility of its becoming necessary at a future time, from the existence of more urgent symptoms, was admitted.

1st. There was a doubt as to the nature of the offending substance. If gristle, it might be softened and coughed up, and would necessarily give rise to less irritation and mischief than bone.

2dly. The clear sound on percussion under the clavicle, and the fact of respiratory sounds being heard there, did not indicate any great amount of obstruction to the entrance of air into the lung: and—

3dly. Though a peculiar rhonchus was heard over the right bronchus, its weight, as an adverse symptom, was materially diminished by the comparatively free respiration in the upper part of the lung. (This apparent inconsistency was fully explained by the position of the foreign body as discovered after death.)

On the 16th, the "cooing sound" had degenerated into a peculiar "whiff" or "puff," heard as before, during expiration. The expectoration was more copious and diffluent, though still mucous and frothy. The cough was at once brought on by any exertion or slight excitement, such as would be caused by the unexpected entrance of a person into the room. Fearful of the effects of this continued irritation

on the structure of the lung, and perhaps on the patient's life, Mr. Arnott's assistance was again sought; and on the 17th, he met Dr. Miller, Mr. Anderson, and myself in consultation. Owing, however, to the uncertainty which was felt in fixing on the exact position of the foreign body, and the consequent doubt as to the possibility of being able to grasp it in the forceps, and the symptoms not being of that urgent nature which called for immediate interference, it was considered inexpedient to undertake an operation.

On the 18th, I found her in the afternoon complaining of much pain in the throat and "all over her," with the skin hot, the pulse 132, and the respirations 48 per minute. A blister, which had been applied the day before under the right clavicle, had given her some relief. In consultation with Drs. M'Intyre and Miller, the following mixture was prescribed:—

℞ Liq. ammon. acet., ℥iss;
Decoct. senegæ, ℥vj;
Tinct. hyoscyami, ʒij.
M. Sumat cochl. ij ampla 4tâ quâque horâ.

May 18th to June 1st. But, not to weary the Society with daily details, I may briefly state that for the following fortnight her symptoms were—disturbed nights, paroxysms of fever occurring almost daily, and generally in the afternoon; profuse night-sweats, general pains, probably from coughing and her own efforts to expel the foreign body. The cough assumed a more paroxysmal character, and was aggravated by any change of position. It was especially violent on first awaking, owing to accumulation of mucus, for on this being expectorated, she obtained temporary relief. She was much distressed also by retching and vomiting when the cough was violent. Her respirations varied from 36 to 40 per minute, and her pulse from 96 to 120. Her urine was high coloured and loaded with lithates, and her bowels acted generally without medicine. The auscultatory signs for this period were more or less dullness on percussion on the right side of the chest posteriorly, whilst under the clavicle a clear sound was given out. Here also the respiratory

murmur was free, whilst posteriorly it was less distinct with increased resonance of the voice. The "expiratory puff" over the right bronchus continued.

The left lung appeared to be free from disease, as far as could be recognised by the ordinary means.

During this period the same plan of treatment was continued, with the addition of a linctus for the cough, and her strength was supported as much as possible by light nutritious diet.

On the 1st of June the symptoms were aggravated; the expectoration was more copious, amounting to a teacupful in the day; but it maintained its frothy, mucous character. She suffered also from general tremor and agitation, with spasmodic action of the diaphragm, as though she were suppressing a cough.

The medicine was now changed as follows:—

℞ Acid. sulph. dilut., ʒiss;
Decoct. senegæ, ℥vij;
Syrup. papav.,
Syrup. tolut., āā ʒss.
M. Sumat cochl. ij ampla ter. quotidie.

From this date to the 21st of June, the symptoms underwent considerable remission. On the 8th the pulse was but 80; she had less fever; and was able to sit up in bed and do some work. Her tongue was clean; her cough on the whole less troublesome; and her strength improved. The "expiratory puff" continued, and she expressed her conviction that the foreign body had not undergone any change of position. She was now allowed a little wine, and on the 17th some quinine was prescribed for her.

On the 22d of June, after some increase in her distress, the expectorated matter first began to assume a change in appearance. It acquired a dingy colour, with some disagreeable odour; and on the 24th, she spat up two teacupfuls of offensive purulent matter, of a pale brownish colour. This was accompanied with great general depression; her pulse was 140, and weak; her respiration hurried and catching; and she complained of severe spasmodic pain, extending from

the ensiform cartilage under the right mamma towards the back, and a burning pain up the centre of the sternum. Her complexion now assumed a sallowish hue.

The following mixture was ordered :—

℞ Potassæ tartratis, ʒiss ;
Aquæ puræ, ℥viij ;
Sp. æther. sulph. comp., ʒij ;
Liq. opii sedat., ♏xl.
M. Sumat cochl. ij ampla 4ta quâque horâ.

And she was directed to take occasionally a wine-glassful of a solution of chlorate of potash, in the proportion of two drachms of the salt to a pint of water, as a drink.

On the 25th, her pulse was 136, her respirations 44 per minute, and her skin hot. The purulent matter was freely expectorated in considerable quantity, and its odour was most offensive, so as to necessitate the constant use of chloride of lime in the room. The lateral measurements of the chest were equal.

The prescription was again altered :—

℞ Acid. sulph. dilut., ʒiss ;
Decoct. cinchonæ, ℥viij.
M. Sumat cochl. ij ampla ter. quotidie.

From this time to the date of her death she never rallied, and her sufferings were most intense from the violence of the cough and the urgent dyspnœa. Aphthous eruptions appeared on the tongue and mucous membrane of the mouth, which prevented her from taking medicine, or even nourishment, for some days. She was only able to sip small quantities of milk or brandy and water. She could obtain no ease but in the erect posture, in which she was supported with pillows. The violence of the cough, and the offensive odour of the purulent matter which she expectorated, induced retching and vomiting, which added to her distress and exhaustion. Her nights were passed sitting up in the bed, with scarcely any rest, and at times extreme restlessness. Her brain, however, remained unaffected; and her lips were not livid, though the face gradually put on a waxy, death-

like appearance. The chief auscultatory signs now were loud mucus râles, and dullness on percussion over the right side of the chest, with blowing respiration in parts. These were, however, less marked under the right clavicle, the air appearing to enter with more freedom into the upper part of the lung than elsewhere.

In this state she continued till the 5th of July, when I found her lying in the horizontal posture in her bed, unable to speak; and her death, which had been daily expected for a week, took place at midnight.

Sectio Cadaveris, 16 *hours p. m.*—Present Messrs. Arnott, Shaw, De Morgan, and Anderson, Dr. Miller, Mr. Palmer, and myself. The following report is drawn up from notes taken at the time by Dr. Miller, and the accompanying drawing by Mr. William Wing gives a correct representation of the appearances observed.[1]

Body much emaciated. Decomposition commencing.—The intercostal muscles in front of the chest on the right side were much darkened, and contrasted strongly with those on the opposite side, which were of the usual florid colour. On exposing the trachea and great vessels in the neck, the right carotid artery was observed to pursue an abnormal course, running obliquely upwards and to the right side in front of the trachea, from a point a little to the right of the left sterno-clavicular articulation; when the sternum was removed, this was found to depend on the innominata artery arising somewhat to the left of its usual point of origin, and taking a more perpendicular course than it ordinarily does, and dividing early into its two branches. The distance from the lower border of the thyroid body to the upper edge of the carotid artery, taken upon a line drawn perpendicularly through the centre of the trachea, was one inch, and this was increased half an inch by continuing the measurement to the top of the sternum. Both the arch of the aorta and the innominata artery appeared to bulge more than usual.

The right lung was seen well filling its own side of the

[1] The preparation is deposited in the Museum of the Royal College of Surgeons.

chest, and in its inferior two thirds was adherent to the ribs and diaphragm respectively; and close upon the latter, in front, there was a pleuritic abscess, the size of the palm of the hand. The left lung appeared somewhat collapsed.

The veins were now tied and divided, and with the large arteries turned back, so as to expose the anterior surface of the trachea and bronchi. The course of the trachea and right bronchus was an oblique curve, deviating but little from the perpendicular, bearing from the upper border of the sternum downwards to the right of the middle line. The left bronchus went off more abruptly. The trachea and right bronchus were now slit up in their whole extent, and found to contain a thin muco-purulent secretion of a pale slate colour. In the latter, at the distance of an inch and a half from the point of bifurcation of the trachea, and five inches and a half from the lower border of the thyroid body, a small piece of bone, weighing, when dry, $3\frac{1}{2}$ grains, was found, having a concave smooth facet, and a convex rough one, and one very sharp edge, its breadth being three eighths, and its length a quarter of an inch. It was firmly impacted in the orifice of the third branch, given off from the bronchus, which passed into the middle lobe,[1] and this accounted for the comparative freedom with which the air appeared to enter the upper part of the lung throughout the case, as evidenced by the auscultatory signs. The mucous membrane around it was of a vivid red colour, and highly injected, but gradually became paler towards the left bronchus, where, as well as in the trachea, it presented its usual colour.

The lower two thirds of the right lung were of an ashy slate colour, of dense consistence, very offensive odour, and infiltrated with a purulent fluid. Small portions of it sunk in water, and when washed it had much the appearance of coarse dark sponge, though no distinct cavities containing pus were visible.

That part of the upper lobe which was not adherent to

[1] The course of this branch of the right bronchus is marked in the drawing by a bristle inserted into it.

the side of the chest, and which was supplied with air by the first branch of the right bronchus, contained air, and the upper portion of it appeared healthy.

The left lung contained no trace of tubercle, and was perfectly healthy.

The heart was large, and slightly distended to the left.

The liver was large, but healthy in structure, and extended into the left hypochondriac region.

Before concluding this paper, I cannot refrain from adverting to a case published by Dr. Gilroy, in the 35th volume of the 'Edinburgh Medical and Surgical Journal,' the history of which so exactly corresponds with that just detailed, as fairly to admit of comparison with it. In both the symptoms underwent a temporary lull, the cough was brought on by any exertion, and the purulent sputa possessed the same fetid odour. Dr. Gilroy's patient survived nearly three months, and after death a large pulmonary abscess was found communicating with a bronchus, in which a piece of chicken bone, weighing 6 grains, was lodged. Mrs. W. lived but two months, and instead of an abscess the lung was found infiltrated with pus. Both cases attest the sufferings and fatality which usually follow this accident, neither of which could have been prevented by any other means short of the removal of the foreign body. No good result could have been anticipated by the plan of inverting the body, as practised in Sir Benjamin Brodie's case, for it could not have been expected that the weight of the pieces of bone could have had any effect in altering their position when the violent cough had failed to do it.

In the case of Mrs. W., it was, from causes which I have mentioned, judged inexpedient to attempt the extraction of the foreign body with forceps after opening the trachea, but possibly a greater amount of experience might have modified this opinion. It is certain, however, that had it been attempted, some difficulty would have arisen from the depth to which the piece of bone had penetrated, being at least four inches from the top of the sternum. Two bronchial

branches had been passed by it, into the first of which, from its size, it is more than probable, that the point of the forceps would have entered, and this might have given rise to such distress as to have baffled any further proceedings.

The proximity of the right carotid artery to the seat of incision would have exposed it to injury. With due caution it would not, probably, have been wounded by the knife, but it might have been bruised and injured by the forceps. Though such a deviation from its course could not be looked for in other patients, it nevertheless deserves attention, and fully bears out the remark of Mr. South, "that the varieties of the vessels in the neck render a careful inspection necessary before proceeding to the operation." [1]

[1] Vide Chelius's Surgery, by South, article Tracheotomy.

ON

SECTION OF THE TENDO ACHILLIS

IN SOME CASES OF

FRACTURE OF THE BONES OF THE LEG.

BY

CAMPBELL DE MORGAN,

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Received October 20th.—Read November 27th, 1849.

The subcutaneous division of tendons for the removal of difficulties which sometimes occur in the treatment of fractures, especially of the bones of the leg, is an operation which has not met with much attention in this country, though in some cases it appears to have been successfully put in practice on the Continent.

In Germany, M. Dieffenbach[1] is reported to have often had recourse to the division of the ligament of the patella or of the quadriceps muscle in cases of ununited fracture, or fracture with wide separation of the broken portions of the patella; and to the division of the triceps brachii in fracture of the olecranon under similar circumstances. The conditions which would render such operations justifiable, must be extremely rare. In France, the operation to which the cases in this paper refer was first performed by M. Meynier.[2] A severe fracture of the tibia and fibula had been followed by violent spasm in the muscles of the leg, suppuration had taken place, and portions of the tibialis anticus, extensor communis digitorum, and extensor proprius pollicis had been destroyed. The ends of the bones were exposed and protruding, and the inferior portions were drawn behind, and formed an angle with the upper, owing to the continued spasm of the

[1] Caspar's Wochenschrift, No. 40, 1842.

[2] Gazette Médicale, 1840, p. 552.

muscles of the calf. After frequent and vain attempts to bring the bones to their place, the question was raised, whether the protruding end should be sawn off, or amputation be performed. Before resorting to either of these operations, however, the idea occurred to M. Meynier of dividing the tendo achillis. This was done, and the result was an immediate and almost complete success.

M. Berard,[1] in a discussion in the Académie de Médecine, on the proper mode of treating compound fracture at the malleoli, stated that he had, in such a case, succeeded in reducing the fractured bones by dividing the tendo achillis, and suggested the propriety of adopting this proceeding, and of thereby, if possible, preventing the necessity of removing the ends of the bones or of amputating the limb.

Malgaigne,[2] also, in his recent work on fractures, mentions that M. Laugier divided the tendo achillis as a means of reduction in a case of oblique fracture of the tibia; but that suppuration took place, and death ensued.

So far as I have been able to ascertain, the following are the only cases in which the operation has been adopted in this country in the treatment of fractures of the bones of the leg, and the results have been such as to induce me to lay them before the Society.

My colleague, Mr. Shaw, has kindly furnished me with the report of the first case.

William Sutters, æt. 40, was admitted into the Middlesex Hospital on the night of February 12th, 1847, having just fallen down stairs, while intoxicated, and broken the bones of his leg. The fracture was found to extend through both the malleoli; and there was great distortion at the ankle-joint, owing to the foot being twisted to the outside. It was not difficult to restore the foot to its proper position; but as soon as that was done, violent spasm came on, and it was displaced as before. Numerous attempts were made by applying splints of different kinds, and placing the limb in various positions, to overcome the distortion; but the patient was so restless

[1] Archives générales de Médecine.

[2] Malgaigne, Traité des Fractures, vol. i, p. 794.

from being drunk, and the spasms so severe, that none of them were successful.

Mr. Shaw saw the patient early on the following morning; the foot was then drawn to a remarkable extent to the outside of the lower part of the leg, and it was at the same time twisted, so that its outer edge was turned upwards, and the sole directed obliquely outwards; it was also placed somewhat backwards, and the lower head of the tibia had the integuments stretched so tightly over it, that the borders of the articulating surface, and the part where the malleolus internus was wanting, could be distinctly felt.

Previous to attempting reduction, the patient was directed to bend the knee; but it was found that any slight movement brought on a violent fit of spasm; and these were not confined to the muscles of the foot and ankle, but they extended to those of the thigh, which became so rigid that he was unable to bend the knee. On grasping the foot and keeping up extension, the muscles would be quiescent for a short time, so as to allow reduction to be effected; but presently the spasm would come on with violence, and with a quivering motion, which, owing to the patient being muscular and the integuments thin, could be seen as well as felt—the muscles would forcibly drag the foot into its former position, making him cry out with the pain. During the continuance of the spasm, the skin over the inner edge of the tibia, where the malleolus was broken off, was drawn so tense that it was in danger of being pierced by the bone; and the tendo achillis became so tight that it was like the string of a bow. Attempts were renewed to secure the foot in a proper position, but these proved as unsuccessful as those made during the night. With the view, therefore, of getting rid of the violent action of the powerful muscles of the calf, Mr. Shaw resolved to divide the tendo achillis; which was accordingly done, by subcutaneous incision, in the usual manner. After that, all the difficulties entirely ceased; the foot was secured in its place by a back metal splint, passing from the sole, behind the calf and thigh, and with side splints along the leg; and there was no return of the spasm.

April.—No further trouble was met with in the treatment. He has been walking on crutches for some weeks, with his ankle secured in starch bandages.

May 7th. He was discharged last month. The ankle is still stiff. No pit or irregularity is to be felt in the tendo achillis where it was divided.

The success which attended the division of the tendon in Mr. Shaw's case induced me to repeat it under the following circumstances.

Mary King, æt. 66, a Billingsgate fishwoman, of drunken habits and broken down constitution, was admitted into the Middlesex Hospital, March 25, 1849, under my care. She had been knocked down by a cab; the tibia and fibula were found to be broken a little above the ankle. The fracture of the tibia was very oblique, the upper end overlapping the lower, and the lower part being drawn backwards, so that the two portions formed an angle with one another. The integuments were uninjured. With some difficulty the leg was placed in a proper position, and it was put up in an iron back splint with side pieces. The woman was very restless, throwing herself about incessantly, complaining of the pain in her leg, which was affected with continually recurring spasms of all the muscles of the ankle and foot, extensors as well as flexors, by which the foot was soon displaced to as great an extent as at first. The bowels were freely acted on; opiates and antispasmodics largely given, but with no effect. Change of position was then tried; the limb was laid on its outer side, with the knee bent, and the bones were again brought into good position. But the spasms immediately returned, and the displacement and the suffering were soon as bad as before. No adaptation of splints nor any change of position seemed to produce the slightest benefit. The pain she endured was very severe; the restlessness continual; she could get but little sleep, and that by snatches between the more violent attacks of spasm. The skin was now becoming tight and painful over the projecting part of the tibia. I determined to divide the tendo achillis, in the hope that the spasm would cease in the anterior muscles when the anta-

gonism of the muscles of the calf was removed. This was done on the 3d of April, nine days after the accident. The leg was at the time lying on the side. She did not know what was being done; but no sooner did the tendon give way than she cried out, "Oh, thank you, Sir, you have given me such ease." And, in fact, from this time all trouble ceased. The spasms never returned, and she remained free from pain. There was some little disposition to the falling back of the foot, but this was readily controlled by the application of an ordinary back splint.

On the 28th April, the chasm left after the division of the tendon, which had never been very great, had disappeared. There was a want of disposition to union in the broken bones. Still about the middle of May she was able to walk on crutches. The foot was free from deformity, save from some thickening around the fractured ends of the bones. She was kept for some time longer in the Hospital, that the case might be watched, and went out in June, being able to walk without crutch or stick, and with a good use of the ankle.*

There can be no question as to the twofold benefit derived in these cases from this simple operation, which, while it rarely fails in effecting the object for which it is performed, is not often attended with injurious consequences. The first and most important benefit was the immediate cessation of all opposition to the replacement of the fractured bones, and to their retention in their proper positions. After the division of the tendon, the simple and ordinary apparatus was sufficient for this purpose; whereas all the means adopted before had induced spasm, and increased only the evil they were intended to remedy. The relief given to the sufferings of the patients, was, however, not less immediate, and was hardly less important. The pain and the restlessness, which before had been constant, at once subsided; and the spasm which took place, not in the muscles of the calf only, but in all the muscles of the leg,—and in Mr. Shaw's case, in those

* Note by the Author. May 10, 1850. This woman is again under my care in the Hospital. Three months and a half before her admission she dislocated her shoulder. Reduction was effected under the influence of chloroform, and she has now a good use of the joint. There is not the slightest weakness of the ankle, and she can use one leg as well as the other

of the thigh also,—were at once allayed. Nor did they, in either instance, return during the remainder of the treatment.

The cases of fracture of the tibia and fibula in which the surgeon fails, by ordinary treatment, to remove or obviate the difficulties incidental to such injuries, and in which, therefore, this operation might naturally suggest itself, are not of ordinary occurrence. But it may still be a question whether the division of the tendo achillis, or of other tendons, might not be advisable. The present state of our knowledge with regard to the results of tenotomy in general, is, perhaps, not sufficiently exact to justify a recommendation of the operation in such cases. As a means of relieving spasm consequent upon local injury, the operation has been too rarely performed to allow of any conclusion on the subject. If, however, it should be found that results as satisfactory as were obtained in the cases now brought forward might be calculated upon in those of less severity, but in which the means used by the surgeon were counteracted, or prolonged pain and restlessness were present in consequence of spasmodic contraction of the muscles, this operation would prove a valuable adjunct to the ordinary treatment.

Although not bearing directly upon the question of tenotomy as applicable to the treatment of fracture, yet it may not be altogether out of place to refer to the proposal by M. Bonnet, of having recourse to the operation, in certain cases, of diseased ankle-joint. After remarking on the advantage of maintaining inflamed joints in a natural position, and on the tendency to elevation of the heel in disease of the ankle-joint, M. Bonnet adds:—

"L'innocuité de la section du tendon d'Achille et la promptitude du redressement qui peut en être la suite, lorsque la rétraction de ce tendon contribue à l'élévation du talon, doivent engager à recourir à cette section de préférence à des moyens plus compliqués. Plusieurs fois je l'ai faite dans le but de redresser le pied étendu dans une maladie de l'articulation tibio-tarsienne; j'ai eu lieu de me louer de cette pratique qui a permis d'atteindre promptement le but physique que j'avais en vue."[1]

[1] Bonnet, Traité des Maladies des Articulations, vol. ii, p. 443.

ON THE

IDENTITY OR NON-IDENTITY

OF THE

SPECIFIC CAUSE OF TYPHOID, TYPHUS, AND RELAPSING FEVER.

BY

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COMMUNICATED BY

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Received November 20th.—Read December 11th, 1849.

THERE are certain diseases which have peculiarities common to all, so characteristic, that, although we are ignorant of their intimate nature, and even of their exact seat, yet they naturally group themselves together and form a class admitting of one general description. This class exhibits equally natural subdivisions. The species, of which these subdivisions are formed, are distinguished from each other by peculiarities even more marked, if possible, than the class in which they are included is from all other classes. The great class to which I refer is that of—

Acute febrile diseases, having a determinate duration, and dependent for their origin on specific causes.

It includes, as distinct species, smallpox, measles, scarlet fever, typhus fever, typhoid fever, and relapsing fever. For many years the first three were confounded under one name, and it was only after the publication of Dr. Withering's essay that measles and scarlet fever were regarded as distinct affections, i. e. distinct as to their course, their symptoms, their lesions, and their causes. The three last-enumerated diseases are yet, by many, looked on as but varieties of one

disease, which merely presents differences in its phases according to epidemic constitutions, individual peculiarities, and hygiènic conditions. The great work of Louis on the Typhoid Affection, by affording a standard of comparison, materially lightened the labour of separating from that disease those which had previously been grouped with it.

The paper of Dr. Gerhard, in the 'American Journal of Medical Sciences' for 1837; the cases collected by Dr. Shatmak, and so ably analysed by M. Valleix; and the excellent paper of Dr. Stewart, in 1840, rendered it highly probable, although they did not prove[1] that typhoid fever and typhus fever were absolutely distinct from each other, i. e. were two species of disease, and not varieties of one affection.

In the 'Monthly Journal' of the present year I have attempted to determine absolutely the question of their identity, by an analysis of the course, the symptoms and the lesions of structure found after death in a certain number of fatal cases, collected by myself during one epidemic. It appeared to me that the conclusion which flows from that analysis is, that, so far as concerns their course, symptoms, and lesions, no two diseases can be more distinct. But not only do the diseases, i. e. smallpox, measles, and scarlet fever, with which I have classed these fevers, differ from each other in course, symptoms, and lesions, but they differ also with respect to the nature of their exciting cause. That cause is specific. We can generate inflammation of any organ at will by a variety of means; but by the application of *one* cause only can we excite smallpox, measles, or scarlet fever. In like manner, typhoid fever, typhus fever, and relapsing fever must require for their production the application of distinct specific causes, if they be distinct diseases belonging to the same class as smallpox, &c.

[1] See Christison on Fever, Library of Medicine; Watson's Lectures, 2d edit.; and especially vol. xii, British and Foreign Medical Review, in which the arguments adduced by the above-mentioned and other authors in favour of the non-identity of typhoid and typhus fever are ably criticised, and the following conclusion arrived at: "That they are the *same species* of disease, but *different* varieties of that species."

The peculiarity which entitles a cause to be termed specific, is that of exciting in those exposed to its action one, and only one, species of disease. Further, all specific causes, the products of individuals labouring under disease, can excite in other individuals only diseases resembling in all essential characters those present in the individual from whom they themselves sprung. Herein lies the test, the *experimentum crucis* by which the absolute non-identity of smallpox, measles, and scarlet fever is proved; for if the same cause, i. e. the poison generated by either, could not only produce the disease from which it had its origin, but also the other two, then the three affections would be regarded as varieties of one disease, and not as distinct species; just as *scarlatina simplex* and *anginosa*, and *scarlatina sine eruptione*, are varieties of each other; and just as *rubeola vulgaris, rubeola sine catarrho*, and perhaps it may be said, certain catarrhs without rubeoloid eruption are varieties of each other. We know, however, that smallpox, measles, and scarlet fever, owe their origin to different specific causes, and therefore we assert that they are distinct diseases. If the same difference in the specific cause of any two other affections be observed, then, however trivial the differences in their symptoms, they too must be held to be distinct diseases; *à fortiori*, will this be true of diseases differing from each other so widely as typhoid, typhus, and relapsing fever, in course, symptoms, sequelæ, and pathologico-anatomical lesions?

The object of this paper is to inquire, whether the specific cause of the three diseases just enumerated is identical?

The materials used for the solution of the question are the cases admitted into the London Fever Hospital during the years 1847, 1848, and 1849.[1]

The diagnosis of relapsing fever rests on the peculiarity of its course and symptoms; of typhoid and typhus fevers, on the skin eruption when present. The following are the diagnostic symptoms of these affections:

[1] To the medical officers of this institution, and especially to Dr. Tweedie, I am indebted for the liberality with which I have been permitted to make unrestrained use of the cases admitted into its wards.

Relapsing Fever.—Sudden rigors, headache, skin hot and dry, tongue white, urine high-coloured, bowels regular, occasional or frequent vomiting, loss of appetite, absence of abnormal physical abdominal signs. In severe cases, jaundice, profuse sweating on about the seventh day, followed by apparent restoration to health; on from the fifth to the eighth day, reckoning from the apparent convalescence, repetition of the original symptoms, with greater or less severity; again terminating in sweating, and then permanent convalescence.

Typhoid Fever—*Rose spots.*—The eruption in typhoid fever appears from the seventh to the twelfth day of the disease, very rarely later, and still more rarely at an earlier period. The characteristic spots are frequently preceded for a day or two by a very delicate scarlet tint of the whole skin.[1] The eruption itself consists of small spots irregularly scattered over the anterior and posterior surface of the trunk. The number of spots on the surface at one time ordinarily varies from six to twenty; sometimes there are very few, at other times, but infinitely more rarely, they are so thickly seated that scarcely an interval of normal cuticle is left between them.

The separate spots are circular, and of a bright rose-colour; this hue passes insensibly at their basis into that of the surrounding cuticle. Their usual diameter is about two lines. They are somewhat elevated; but, although perceptible to the finger passed lightly over the surface, they possess none of the seed-like hardness of the first day's eruption of smallpox, nor are they so prominent and perceptible to the touch as the papulæ of lichen. Their surface is rounded, lens-shaped, never acuminated. No trace of vesication can be detected on their apices. If tolerably firm pressure be made on these spots, they entirely disappear; but they resume their distinctive colour and elevation as the finger is being withdrawn. The above characters are pre-

[1] This tint closely resembles, as I have elsewhere remarked, that of the skin of a person soon after leaving a hot-bath. It is important to be acquainted with it, because when it is more marked than usual, and sore throat is also present, it may be mistaken for the rash of scarlet fever.

served by each spot from its first appearance till it disappears. When, however, the duration of a spot is prolonged to five or six days, it usually becomes before that time very small, and less bright in colour; still, however, it disappears on pressure. The ordinary duration of each spot is about two days, but it varies from two to six days. Fresh spots appear every day or two from the outset of the eruption, till from the twenty-first to the twenty-eighth day of disease. This successive daily eruption of a few small, very slightly elevated, rose-coloured spots, disappearing on pressure, each spot continuing visible for three or four days only, is, so far as I know, peculiar to, and absolutely diagnostic of typhoid fever.

Typhus Fever—*Mulberry rash.*—The eruption in typhus fever appears on from the fifth to the seventh day, and reaches its maximum amount in a day or two. It occupies the trunk and extremities, and occasionally the face. It consists of distinct spots and a subcuticular rash.

The frequent absence of one of these elements of the mulberry rash, the different proportions they bear to each other, the depth of hue of either, as well as the changes they undergo in their physical characters, cause considerable variations in the appearance of the rash in individual cases.

1*st. Distinct spots.* The spots vary in number. Sometimes they are very few, and pretty equally diffused over the whole surface; at others, while there are but few spots on the anterior surface of the trunk, the posterior is covered; or again, they may be innumerable anteriorly as well as posteriorly, ordinarily they are very numerous. Their size varies from a mere point to two, three, or four lines in diameter. Sometimes two or three spots coalescing, give rise to very large irregularly-shaped patches. Each spot passes through two, and in many cases, three stages.

First stage.—The spots on their first appearance are slightly elevated, somewhat flattened on their surface; have a dusky pinkish-red colour, somewhat like the stains of mulberry juice; and disappear completely on pressure, resuming their distinctive appearances as the finger is being

withdrawn. *Second stage.*—In from one to three days these spots undergo a marked change; they are no longer elevated above the level of the cuticle; their hue grows darker and more dingy; and instead of disappearing on pressure, they only fade, i. e. when the finger is firmly pressed on them they grow paler, but do not entirely disappear. In some cases the spots, after reaching this stage, pass into faintly marked, reddish-brown stains, and then vanish. *Third stage.*—In many cases, and especially those that are severe, the spots reach a third stage; their centres become dark purple, and are unaltered in appearance by the firmest pressure, although their circumferences still fade; frequently entire spots, circumference as well as centre, change into petechiæ.

The duration of each of the above-described spots is from its eruption till the termination of the disease. But a few large, almost scarlet patches, are occasionally seen on the back of the hand on the fifth or sixth day of the disease; these usually disappear altogether in a day or two.

The Subcuticular Rash.—When the trunk is covered with mulberry rash, many of the spots are usually pale, very imperfectly marked as spots, and run into each other; these spots are seen indistinctly, as if situated beneath the cuticle; or as the vulgar say, are "not well out." They give to the skin a mottled aspect, and on this mottled surface, as on a ground, the darker, more distinct, and decidedly marked spots are situated. Like the distinct spots, the subcuticular rash is deepest coloured on the most depending parts of the body.

The subcuticular rash may precede or be preceded for a day or two by the distinct spots, i. e. the eruption is for a day or two very pale, and then some spots grow more distinct, or a few well-marked spots first appear, and then after a day or two the rash becomes more abundant. The diagnostic characters which separate the spots of typhoid from those of typhus fever are then derived from the colour, shape, duration, and the changes in physical characters which each spot severally experiences in the course of these diseases.

Number of cases admitted into the London Fever Hospital during the separate months of 1847; with

All the cases in which two or more persons suffering from typhus fever, typhoid fever, and relapsing fever, were admitted from the same house, into the London Fever Hospital, in 1847.
This table exhibits the age, sex, degree of intimacy of the individuals, and the nature of the disease under which they laboured.

Months.	Rose spots.	Mulberry rash.*
		•

Months.	Ages of males.	Ages of females.	Degree of intimacy.	Nature of disease.	Remarks.
May	30, 32 .	28	Lodgers	Typhus fever ...	All mulberry rash.
July	25 ...	20	Husband and wife	Relapsing fever ..	No spots.
	17 ...	20, 33 .	Brother, sister, and sister-in-law	Typhus fever ...	
September	14, 19	.....	Brothers	Typhoid fever ...	Both had rose spots.
	21 ...	24	Brother and sister	Typhus fever ...	Both had mulberry rash.
	.....	16, 21 .	Niece and aunt	Typhus fever ...	Both had mulberry rash.
	22 ...	24	Husband and wife	Relapsing fever ..	No spots.
October ..	16 ...	34	Mother and daughter	Relapsing fever ..	No spots.
	55 ...	35	Husband and wife	Relapsing fever ..	No spots.
	40 ...	36	Husband and wife	Relapsing fever ..	No spots.
	13 ...	13	Brothers	Typhus fever ...	Both had mulberry rash.
November	.....	21, 23 .	Sisters	Typhoid fever ...	Both had rose spots.

* I have no means of determining these particulars for 1847.

Number of cases admitted into the London Fever Hospital, during the separate months of 1848, with

Month.	Rose Spots.	Mulberry Rash.
January .	8	30
February .	8	27
March . .	5	43
April . .	4	48
May . . .	3	47

All the instances in which two or more cases of typhus, typhoid, and relapsing fever were admitted from the same house, into the London Fever Hospital, in 1848.

This table shows the age, sex, degree of intimacy of the individuals and the nature of the disease under which they laboured.

Month.	Ages of Males.	Ages of Females.	Degree of Intimacy.	Nature of Disease.	Remarks.
January .	22 . .	22 . .	Husband and wife .	Typhus fever .	The man had mulberry rash, the wife no spots.
	30 . .	24 . .	Brother and sister .	Typhus fever .	Both mulberry rash.
February .	. .	11, 33 . .	Mother and daughter .	Typhus fever .	The child had no spots.
	14 . .	7, 11, 43 .	Mother and three children	Typhus fever .	All mulberry rash.
March . .	13, 50 .	35 . .	Father, son, and sister-in-law . . .	Typhus fever .	All mulberry rash.
	5, 15 .	13, 44 . .	Mother and three children	Typhus fever .	The infant was convalescent, the mother had mulberry rash, the two elder children no eruption.
	8 . .	30 . .	Mother and son . .	Typhus fever .	Child had no eruption.
	13, 19 .	16, 20, 45 .	Mother and four children	Typhus fever .	All mulberry rash.
	5 . .	13, 44 . .	Mother and two children	Typhus fever .	Mother mulberry rash, children no eruption.
April . .	. .	8, 18, 20, 24 .	Sisters and lodger .	Typhus fever .	All mulberry rash.
	18, 27 .	. . .	Slept in the same room	Typhus fever .	Both mulberry rash.
	. .	26, 49 . .	Mother and daughter .	Typhus fever .	Both mulberry rash.
	. .	9, 17, 35 .	Mother and daughters .	Typhus fever .	All mulberry rash.
	. .	12, 42 . .	Mother and daughter .	Typhus fever .	Both mulberry rash.
	20 . .	16 . . .	Brother and sister .	Typhus fever .	The boy had mulberry rash, the girl no eruption.
May . . .	20, 21 .	19 . . .	Brothers and sister .	Typhus fever .	The sister had no eruption, brothers mulberry rash.
	. .	11, 18, 33 .	Occupied the same room	Typhus fever .	The child had no spots, the others mulberry rash.
	19, 58 .	39 . . .	Father, mother, and son	Typhus fever .	All mulberry rash.

June . .	10	35	June . .	17, 25 . .	. . .	Slept in the same room	Typhus fever .	Both mulberry rash.
				11, 38 . .	. . .	Father and son . .	Typhus fever .	Father mulberry rash, son no spots.
				12, 15, 42 .	29. . .	Father, sons, lodger .	Typhus fever .	All mulberry rash.
July . .	11	37	July . .	19. . .	20. . .	Brother and sister .	Typhus fever .	Both mulberry rash.
				. . .	30, 40, 45 .	Inmates of the same ward at workhouse . .	Typhus fever .	All mulberry rash.
				9, 13 . .	. . .	Brothers . . .	Typhus fever .	Elder mulberry rash, younger no spots.
				15, 44 . .	. . .	Father and son . .	Typhoid fever	Both had rose spots.
August . .	11	25	August . .	. . .	11, 36 . .	Mother and daughter .	Typhus fever .	Both mulberry rash.
				47. . .	47. . .	Husband and wife .	Typhus fever .	Both mulberry rash.
				12, 17 . .	. . .	Brothers . . .	Typhus fever .	Both mulberry rash.
				11, 14 . .	50. . .	Mother and children .	Typhus fever .	All mulberry rash.
September.	22	32	September.	4, 10, 13, 42 .	6½ . .	Father and children .	Typhus fever :	Father and daughter had mulberry rash, the three boys no spots.
				. . .	5, 6 . .	Sisters . . .	Typhoid fever	Both had rose spots.
				47. . .	11, 33 . .	Husband, wife, and child	Typhus fever .	All had mulberry rash.
				10. . .	12. . .	Brother and sister .	Typhoid fever	Both had rose spots.
				11. . .	13. . .	Brother and sister .	Typhoid fever	Both had rose spots.
October .	16	18	October .	16, 46 . .	. . .	Father and son .	The father typhus fever .	Mulberry rash.
							The son typhoid fever .	Rose spots.
November .	13	38	November .	19, 21, 29 .	7, 14, 20, 22, 60	Inhabitants of one house	Typhus fever .	The youngest child had no spots, the other seven had mulberry rash.
				26, 54 . .	23, 49 . .	Whole family . .	Typhus fever .	All mulberry rash.
December .	7	10	December .	7, 23, 52 .	16, 34 . .	Whole family . .	Typhus fever .	All mulberry rash.

Number of cases admitted into the London Fever Hospital, during the separate months of 1849, with			All the cases in which two or more persons suffering from typhus fever, typhoid fever, and relapsing fever were admitted from the same house into the London Fever Hospital in 1849. This table exhibits the age, sex, degree of intimacy of the individuals, and the nature of the disease under which they laboured.					
Month.	Rose Spots.	Mulberry Rash.	Month.	Ages of Males.	Ages of Females.	Degree of Intimacy.	Nature of Disease.	Remarks.
January	9	24	January	9, 37	. . .	Father and son	Typhus fever	Both had mulberry rash.
				25	22, 30	Husband, wife, and lodger	Typhus fever	All had mulberry rash.
				26, 30	25	Husband, wife, and lodger	Typhus fever	All had mulberry rash.
				14, 50	47	Husband, wife, and child	Typhus fever	All had mulberry rash.
February	6	18	February	10, 48	. . .	Father and son	Typhus fever	Both had mulberry rash.
				9, 14	16, 38, 53	Mother, children, and aunt	Typhus fever	The child, æt. 9, had no spots. All the rest had mulberry rash.
March	5	22	March	10, 17	. . .	Brothers	Typhoid fever	Both rose spots.
				6, 8, 29	. . .	Father and sons	Typhus fever	All mulberry rash.
				. . .	53, 61	Occupied the same room	Typhus fever	Both mulberry rash.
				24, 24, 28, 29, 31	26	Same room, lodging house	Typhus fever	All mulberry rash.
April	4	15	April	6, 21	35, 40	Mother, children, and nurse	Typhus fever	All mulberry rash.
				12	9, 16, 21	Brother and sisters	Relapsing fever	
May	4	16	May	21	21	Husband and wife	Typhus fever	Both had mulberry rash.
June	11	12	June	. . .	12, 44	Mother and daughter	Typhus fever	Both had mulberry rash.
				. . .	20, 30	Sisters	Typhoid fever	Both had rose spots.
July	16	6	July	. . .	18, 18, 51	Visitors, lived in the same court	Typhoid fever	All had rose spots.
				21, 15	9	Brothers and sister	Typhus fever	All had mulberry rash.
August	15	8	August	42	49	Husband and wife	Typhus fever	Both had mulberry rash.
				10, 13, 16	. . .	Brothers	Typhoid fever	All had rose spots.
				16	13, 54	Mother and Children	Typhus fever	All had mulberry rash.
September	15	11	September	. . .	13, 16, 54	Mother and Daughters	Typhus fever	All had mulberry rash.
				40	47	Husband and wife	Typhus fever	Both had mulberry rash.
October	23	6	October	. . .	23	Master had fever, diarrhœa, and passed blood	Typhoid fever	Rose spots.
November	10	5	November	40, 40	12, 34	Husband, lodger, wife, and child	Typhus fever	All had mulberry rash.
				9, 12, 22	. . .	Brothers	Relapsing fever	

Into these tables are collected *all* the cases in which more than one of a family, or more than one inhabitant of a house, suffering from Typhoid, Typhus, or Relapsing Fever, were admitted into the London Fever Hospital, during the periods specified.[1]

It will be observed, that in 1847 there were admitted into the London Fever Hospital two or more cases of typhus fever from each of five separate localities; that two cases of typhoid fever were received from either of two localities; and two cases of relapsing fever from each of five distinct localities. Twelve cases of typhus fever having been brought from five houses, four cases of typhoid fever from two houses,

[1] I ought to qualify the expression "*all* the cases," because it was not till the year 1848 that the diagnosis between these diseases was made with reference to *all* the cases admitted into the Hospital. The consequence is that not only are there no data for determining the numbers of each of the three affections received into the Hospital during 1847, but there are no data for determining, in many instances, to which of the three diseases any given case ought to be referred; i. e. the past histories of particular cases were only partially obtained, the exact locality from which the patient came was not recorded, the name of the street, or even parish, being often all that was ascertained. I have, therefore, been obliged to omit very many cases received into the Hospital in 1847; but I have included *all* those of which the records available for my purpose permitted the diagnosis to be made, and the locality from which the patient came, to be learned. In 1848, comparatively very few cases were admitted of which the diagnosis was not recorded, and the exact residence ascertained; and during 1849, the greatest care was taken to ascertain the locality from which each case was received. Since the middle of 1848, the diagnosis of the cases here used has been made or verified in nearly every instance by myself. In 1849 in every case. Before the middle of 1848, the characters of the spots were in many cases recorded by my friends Mr. Sankey, or his assistant, Mr. Humphrey, i. e. if two of one family entered the Hospital, the notes of one of the cases were frequently taken by either of those gentlemen, while I kept record of the other; this fact I regard as valuable, because it was only on collating these notes, eighteen months after they were made, that I became aware of many of the facts embodied in this paper.

and ten cases of relapsing fever from five houses, in the course of six months. During the same time not a single example was observed of either disease communicating the other, or of cases of the three diseases, or even of two of them, being generated by the same cause. All these diseases, be it remembered, prevailing in this city at the same time.

During the year 1848 there were admitted into the London Fever Hospital two or more cases, one of which presented the symptoms of typhus fever, from each of thirty-four localities. These thirty-four foci of disease yielded on the whole 101 cases. During the same year, more than one fourth of the cases of fever received into the Hospital were examples of typhoid fever, therefore one fourth, i. e. twenty-five of the 101 cases ought, if typhoid and typhus fevers are but varieties of each other, to have presented the symptoms of typhoid fever;[1] but, as the above tables show, in one instance only were two patients, one of which laboured under typhoid, and the other under typhus fever, brought from the same house. The cases referred to are those of a man æt. 46, who was admitted October 10th, 1848, with well marked typhus fever, and his son, æt. 16, who had been received into the Hospital

[1] Although one could not have expected the cases of typhoid and typhus fevers, that is to say, supposing their cause was identical, admitted from any locality, to have borne to each other the exact proportion that the total numbers of the cases of either disease, admitted into the Hospital during the same period of time, did to each other, yet an approach to that proportion ought absolutely to have been present in a majority of instances; while if occasionally the cases of either disease were proportionally too few, they would on other occasions have been, if derived from the same cause, proportionally too many. I have, therefore, used the relative proportion of the cases of the two diseases admitted into the Hospital as a standard. It appears to me that correct conclusions are, in a question of the nature considered in the text, more likely to be arrived at by cumulative evidence, such as is above adduced, than by the application of the calculus of probabilities to any one number of cases, however large that number might be.

on September 19th, with equally well marked typhoid fever. The diagnosis of the latter case was made by my friend Mr. Humphrey. I verified the diagnosis in the case of the father. But in this apparent exception to the rule, the mother of the boy had visited him in the Hospital, and therefore might have carried the contagion of typhus fever to her husband. The father, moreover, had been little exposed to the contagion emanating from the son, because the latter, a vagabond, at variance with his father, was from home when he was taken sick.

From January 1st to November 26th, 1849, there were received into the Hospital two or more cases, of which one presented the symptoms of typhus fever, from each of eighteen separate localities. These eighteen localities afforded fifty-one cases. During the same eleven months nearly half the cases received into the Hospital were suffering from typhoid fever. The whole number of cases admitted was 262; of typhoid fever, 116—of typhus fever, 143—therefore nearly half, or exactly 22·6 of the 51 cases admitted from the eighteen localities ought to have had typhoid fever, i. e., if the cause of the two fevers is identical, while, as the above tables show, not one of the 51 presented the symptoms of that disease.

We see from these tables, moreover, that in 1848, two cases of fever, one of which presented the symptoms of typhoid fever, were admitted from each of five distinct localities; now, as rather more than three fourths of the cases admitted into the Hospital during the same year, laboured under typhus fever, the remaining five of the ten ought to have had typhus fever, but one only did so. To this apparently exceptional case I have before referred.

From January 1st to November 26th, 1849, two or more cases, one of which was suffering from typhoid fever, were received into the Hospital from four localities, in the whole ten cases. Seeing that rather more than half the cases admitted into the Hospital during the same period had

typhus fever, the remaining ten cases ought to have presented the symptoms of typhus fever, if, as I have before observed, the cause of the two diseases is identical. But in not a single instance was a case of typhoid fever and a case of typhus fever admitted into the Hospital, from the same house, during the eleven months of 1849.

The foregoing tables demonstrate, that in every month of 1848 and 1849, several cases of typhoid fever and typhus fever were admitted; that the epidemic constitution favorable to the spread of typhus fever had little influence in diminishing or increasing the absolute number of cases of typhoid fever;—thus, during the first eight months of 1848, 60 cases of typhoid fever, and 292 cases of typhus fever were admitted into the Hospital; and during the corresponding months of 1849, 70 cases of typhoid fever, and 121 only of typhus fever; so that, while the cases of the latter disease had diminished nearly three fifths, the cases of the former had increased only one sixth.

As some writers have asserted that there are certain transition cases to be observed, marking the passage of one epidemic constitution into another, I ought here to remark, that with reference to the characteristic peculiarities of typhoid fever, and the rose spots in particular, they were as well marked in the autumn of 1846, as during the epidemic of relapsing fever in 1847, or of typhus in the autumns of 1847 and 1848, or as they are at the present moment. The spots have undergone no change, have experienced no modification; although the epidemic constitution, on which the difference in the rash is said to depend, must have varied more than once. The same is true of the mulberry rash of typhus fever. It presented, in the few cases observed in 1846, the same characters as during the epidemic of 1847-48; the same characters during that epidemic as at the present moment, when the number of the cases of typhoid fever bear to that of typhus fever the proportion of three to one.

So with regard to the intestinal lesion. In all the fatal cases examined in the three years referred to, in which the mulberry rash existed during life, Peyer's patches, and the mesenteric glands were absolutely free from disease, and in every fatal case in which rose spots were noted during life, serious lesion of the agminated and mesenteric glands was discovered after death. The lesion, like the eruption, was quite unmodified by that epidemic constitution which favoured the spread of typhus fever in 1847 and 1848;—for example, although the constitution of the autumn of this year (1849) favoured the spread of typhoid fever, yet, when a man and his wife were admitted in August with typhus fever, the mulberry rash preserved its characteristics unmodified, and when they died, as both did, Peyer's patches and the mesenteric glands were found to possess their normal anatomical characters.

There are a few cases included in the preceding tables, which may here be more fully adverted to with advantage. In November and December 1848, forty-eight cases of typhus fever, and twenty of typhoid fever, were admitted into the Hospital, i. e., nearly one third of the patients were affected with typhoid fever. At the latter end of October, 1848, a boy, 14 years of age, went to reside with a family named Mitchell, in Adden Place, St. Pancras. The Mitchells were at that time in health. The boy left his own home because his brothers were "down with the fever." This lad was, early in November, admitted into the Hospital, suffering from typhus fever. Early, also, in the same month, the man Mitchell, aged 29 years, with whom the boy lodged, the man's daughter, aged 7 years, and a female lodger, aged 22, were also admitted with typhus fever. The other members of Mitchell's family, expelled from Adden Place, then removed to 21, Hertford Street, at least a mile from their former residence. At this time, so far as I could learn by personal inquiry, there was no fever in Hertford Street, and *certainly* none in the house in which they had taken up their

residence. On November 22d, the two sisters of Mitchell's wife, aged respectively 14 and 22, who had removed from Adden Place with Mrs. Mitchell and her infant, aged 4 years, were received into the Hospital, both suffering from typhus fever. On December 8th, the landlady of 21, Hertford Street, aged 60 years, was admitted with very severe typhus fever; and on December 20th, the son-in-law of the landlady was also admitted with the same disease. I subsequently saw Mitchell's infant, aged 4 years, at its own home; it was similarly but very slightly affected. The only member of the family that escaped was the woman Mitchell, and she had had "spotted typhus fever," according to her own voluntary statement, some few years before.[1] Here was a group of persons, whose ages varied from four to sixty years, and whose constitutional predispositions also must have varied infinitely, for there were several of them unconnected by blood, exposed to the poison of typhus fever, (introduced among them by the lad aged 14,) at a time when typhus fever was only twice as prevalent as typhoid fever. What was the result? Did one third of the eight have typhoid fever? No, not one.

In December, 1848, ten cases of typhus fever and seven of typhoid fever were admitted into the Hospital. Five cases came from one house; these five individuals varied in age from 7 to 52 years,—their degree of relationship was, grandfather, daughter, and three grand-children. All five

[1] I may here observe that I have never known the same individual to be affected twice with typhus fever. The same person has been admitted twice, or, indeed, oftener, into the London Fever Hospital. But on reference to the Hospital records, or to my own notes, I have invariably found that such persons had at the one time a different disease from that present at the other. Thus two boys were admitted, Sept. 1849, with typhus fever; they had been inmates of the Hospital in 1846. Reference to the Hospital records of that year proved that they then had relapsing fever. I know no evidence, I repeat, to prove that typhus fever attacks the same individual *twice* more frequently than typhoid fever.

had well marked mulberry rash, were unequivocally affected with typhus fever. It is evident that, as at this time, the number of those admitted with the two diseases was pretty nearly equal; two of these five ought, if the cause of the two diseases is identical, to have had typhoid fever, with rose spots.

In March and April, 1849, eight cases of typhoid fever, and thirty-one cases of typhus fever, were admitted into the Hospital. Between the 19th of March and the 10th of April, eight persons were brought to the Hospital from one room, suffering from fever. Did one fourth present the rose spots of typhoid fever? No, not one—all had well marked typhus fever.

In September, October, and November, 1849, eighteen cases of typhus fever, and forty-eight cases of typhoid fever, were received into the Hospital, *i. e.*, nearly three times as many cases of typhoid fever as of typhus fever. During the same three months, a mother and her two daughters, aged respectively 54, 16, and 13; a husband and wife, aged 40 and 47; a husband, wife, child, and lodger, aged severally 40, 39, 12, and 40—i. e., in all nine persons, were brought from three localities. At least five ought to have had typhoid fever, if that affection and typhus fever are due to the same specific cause. Was it so? No, in every case the persons secondarily affected, whatever their age or sex, had the same disease as the individual from whom they caught it.

In April, 1849, a girl, suffering from relapsing fever was brought from a house in Fulham — in a few days her brother and two sisters were admitted into the Hospital. Did either of the three latter have typhus fever, which was the prevailing disease, or typhoid fever, which was then also very much more widely-spread than relapsing fever? No; all had the same fever.

Although not absolutely necessary for the purpose of my argument, I may observe that I have visited, in a few in-

stances, the houses[1] from which more than one individual affected with typhoid fever, or typhus fever, were brought to the Hospital, without being able to detect any hygiènic differences in the condition of the people, or in the localities themselves to modify the exciting cause.

Before concluding, it will be well summarily to repeat, that in 1848, one fourth of the cases admitted into the Hospital had typhoid fever; while, from thirty-four foci of typhus fever, yielding 101 cases, there was brought to the Hospital once only a case of typhus fever and a case of typhoid fever from the same house; and during the same time, among five localities, affording nine cases of typhoid fever, one locality only, viz. the house from which the father and son before referred to were brought, yielded a case of typhoid and one of typhus fever. That in 1849, although eighteen foci of typhus fever yielded fifty-one cases, and four foci of typhoid fever afforded ten cases, not a single example of the two diseases being received into the Hospital from one house occurred. With reference to the exceptional case, I must observe, that for exceptional cases to be of any value in proving the identity of typhus fever and typhoid fever, they must be met with more frequently than similar exceptional cases are met with in diseases having a specific cause, universally acknowledged to be different.

Now, the following facts prove that, with respect to measles, scarlet fever, and typhus fever, such exceptional cases are as frequent as with respect to typhoid and typhus fevers. During the last three years I have seen a case of typhus fever brought into the Hospital from a house in which all the children were suffering from measles; another case of typhus fever brought from a house in which the children had scarlet fever; a girl admitted with scarlet fever, who

[1] These houses were situated in courts or streets in the City, Bethnal Green, St. Pancras, and Holborn. I visited too few and made too imperfect inquiries to draw any *strict* inferences, but my *general* impression is stated in the text.

had been on terms of intimacy with another girl admitted shortly before with typhoid fever. And in these cases no direct contagion for the diseases under which the patients laboured could be traced. It is also important to observe, that the cases of scarlet fever admitted during the time specified, were nothing like so numerous as the cases of typhus fever or of typhoid fever.

The facts contained in this paper appear to me to prove, incontestably, so far as induction can prove the point, that the specific causes of typhus and typhoid fevers are absolutely different from each other, and to render in the highest degree probable, that the specific cause of relapsing fever is different from that of either of the two former. I have elsewhere, as I stated at the opening of this paper, attempted to prove that the course, the symptoms, the lesion, and the sequelæ of typhoid and typhus are different, and as relapsing fever differs from both too widely, so far as symptoms and course are concerned, to be confounded with them, it follows that if smallpox be separated from measles, and both from scarlet fever, because their course, symptoms, lesions, and specific cause are different, so must, for like reasons, typhoid fever, typhus fever, and relapsing fever be separated from each other, and regarded as absolutely distinct diseases, not merely varieties of each other, as are scarlatina anginosa and scarlatina sine eruption, but distinct species of disease, as are scarlatina, rubeola, and variola.

I have, throughout this paper, expressed myself as if the specific cause respectively of typhoid fever, typhus fever, and relapsing fever, was an influence emanating from the bodies of those affected with either disease. With respect to the contagious nature of typhus fever, I know no one who entertains a doubt. If typhoid fever be contagious, it is infinitely less so than typhus fever. My experience leads me to regard it as contagious. Those who believe typhoid fever to be non-contagious while they admit the contagious nature

of typhus fever, cannot for a moment doubt the difference in the specific causes of the diseases. It would not, it ought to be observed, have weakened the force of the facts adduced if I had regarded these diseases as non-contagious, because the question here considered is not how the individuals respectively got the disease, but if the same cause, whether contagion or any other, can produce typhoid fever, typhus fever, and relapsing fever.

A CASE OF

COMPLETE INTESTINAL OBSTRUCTION,

ARISING FROM

DISEASE OF THE SIGMOID FLEXURE, OF THE COLON AND THE RECTUM;

IN WHICH THE DESCENDING COLON WAS SUCCESSFULLY OPENED IN THE LOIN.

BY

FREDERICK FIELD, M.R.C.S.

OF BIRMINGHAM.

COMMUNICATED BY

JOSEPH HODGSON, F.R.S.

Received December 24th, 1849.—Read January 8th, 1850.

I WAS requested to see Joseph Ridding on the evening of Sunday, 3d of May, 1846. He was a strong man, of a lymphatic temperament, rather corpulent and muscular, and weighed about fourteen stone. He was by occupation a coach-axle forger, 33 years of age, the father of ten children, of whom six were living. He states that he had always enjoyed very good health, and with the exception of occasional sciatica, he never suffered from any serious illness or injury. In his employment he has been accustomed to drink about a gallon of beer daily, but he considers that his habits have not been generally intemperate.

He dated the commencement of derangement in his bowels about twelve months back, previously to which they had always been very regular and easily acted upon by purgative medicines. From that time he was occasionally subject to pain in the bowels, tenesmus and constipation, his stools becoming scanty, and voided with difficulty; he had also a good deal of flatulence and distension of the belly, with weight and uneasiness at the stomach after eating. *Three months ago* all these symptoms became increased; they

were temporarily relieved by the action of purgatives, as castor-oil, colocynth, and magnesia, which he frequently took, but previously to their operation they greatly aggravated the symptoms. The distress which followed his meals now became more severe, and was often followed by vomiting, his bowels being obstinately costive, his stools being more scanty and voided with greater difficulty; he states also that they were more fluid, but he had not noticed that their diameter was less than formerly. Nine days before my visit his complaint was becoming worse, and he could obtain only very small quantities of stools by repeated doses of purgatives. However, he had been able to continue his employment till within four days of my visit, when the natural action of the bowels entirely ceased; all his symptoms became greatly aggravated, and he took repeated doses of brandy and castor-oil with the only effect of adding to his sufferings and producing vomiting.

On my first visit I recollected having seen him three months previously, at which time he cursorily mentioned his being occasionally subject to what he called "the windy bellyache," but for which he did not require treatment. The abdomen was now greatly distended and tympanitic; pain was chiefly felt in the situation of the transverse colon, and was much increased by pressure, and at this part some bulging was also observed; he described the pain as of a "twisting" character, and shooting down to the umbilicus. At short intervals the pain was aggravated in violent paroxysms, accompanied with strong tenesmus, which continued about a minute, and then as quickly subsided. He vomited almost everything which he took. The pulse was rather increased in frequency, full, strong, and compressible. Tongue coated with a thick, pale fur, and not dry; much thirst. He was ordered to take immediately—Calomel, gr. v; powdered opium, gr. ij: to be followed by a black draught every four hours.

May 4th.—There was some temporary abatement of symptoms after taking the calomel and opium last night, but there is no improvement this morning; the vomiting

still continues, the abdominal symptoms are unabated, and there is no action of the bowels; the urine is scanty and high-coloured. The calomel and opium pill was repeated, and followed by an effervescing draught containing four drops of diluted prussic acid every three hours; and he took one table-spoonful of castor-oil in peppermint water every six hours. In the evening the pain and vomiting were much diminished; the pills and castor-oil had not been rejected, but the abdominal distension and tenderness were very great, and the bowels were still not acted upon; the rectum, so far as the finger could reach, was found perfectly healthy, and no obstruction could be felt. He was ordered to have a warm bath immediately, and afterwards an enema, containing castor-oil and turpentine, of each one ounce, to be given with as much warm water as could be injected. The pill containing calomel and opium, and castor-oil to be continued.

5th.—He passed a much better night after the bath, but this morning his symptoms have returned as severe as ever. More than a pint of the clyster could not be injected, and this returned immediately, the patient being unable to retain it from the painful feeling of distension it caused in the lower part of the belly; only a very small portion of scybalæ was brought away. The colon tube passed up the rectum to the distance of about eight inches. This morning, in consequence of the urgency of the symptoms, twelve ounces of blood were taken from the arm, to the approach of syncope, and the following pills were ordered:

℞ Hydrargyri chloridi, gr. xij;
Pulv. opii, gr. iij;
Extract. coloc. co., ℈j.
M. et in pilulas vj divide, capiat unam tertiis horis. Repetatur mistura effervescens.

6th.—The blood drawn yesterday presented no inflammatory characters, the coagulum being neither buffed nor cupped; his symptoms were mitigated by the bleeding, but they have again become urgent. There is no action of the bowels, and vomiting is still frequent. Mr. Alfred

Baker accompanied me to see him to-day, and the following pills were ordered :—

℞ Olei tiglii, gt. j ;
Extr. coloc. co., gr. x.
M. divide in pilulas ij tertiis horis sumend. Repetatur mist. efferves. Habeat balneum tepidum.

In the evening there was no improvement; the pills were quickly vomited, in consequence of the pain and sensation of burning which they produced in the stomach. The colon tube was again passed, but when about eight inches had been introduced it met with the obstruction as before. The following enema was injected into the rectum :

℞ Olei tiglii, ♏ iij ;
Ext. hyoscyami, ʒss ;
Misturæ assafœtidæ, ℥jss.
M. fiat enema.

This was forcibly returned before the whole could be injected, bringing away but the most trifling portion of hardened fæces.

7th.—Remains in much the same state as yesterday. His strength as yet is but little reduced; the pulse being full and strong; the pain and tension of abdomen not materially increased; the tongue is covered with a dry brownish fur, and there is much thirst. The pills appeared to aggravate his symptoms, and they were returned by vomiting. To have a warm bath; to take two grains of opium in a pill directly, and one table-spoonful of castor-oil every hour. The colon tube was introduced to the same distance as before, and an enema of warm water was administered, but more than a pint could not be injected, and this brought away but a very small portion of fæces. In the evening it was found that the warm bath and opium had had the effect of considerably relieving his symptoms, and he had taken eight doses of the oil before the vomiting returned, when the whole was rejected. The opium pill was ordered to be repeated at night.

8th.—He passed the early part of the night rather

more comfortably, but this morning he was distressed by the increased severity of his symptoms, the vomiting being more frequent, and the tension and tenderness of the abdomen greater. He was now again bled to twelve ounces, when fainting was induced, and his symptoms relieved; croton oil was ordered to be rubbed on the abdomen. In the evening he was more comfortable; the colon tube was again passed, and warm water injected, with no better result than before. The two grains of opium were repeated at night. The blood drawn in the morning presented no inflammatory characters. During the four following days he continued much in the same state as previously described, his strength and spirits bearing up against the severity of his complaint in a remarkable manner; indeed, when free from pain and vomiting, his calmness and quietude were surprising. The more urgent symptoms were much subdued by the administration of an opiate night and morning, and the action of the bowels was endeavoured to be effected by an ounce of castor-oil daily and the exhibition of enemata, but these at length failed to bring away any fæcal matter.

On the 10th the cold douche was tried, but no other effect followed than profuse sweating, which temporarily relieved his symptoms. On the 13th the vomiting, and also the tension and tenderness of the abdomen, had become much more severe, and he was then seen by Dr. Fletcher. It was now thought advisable to administer the opium in a larger dose, in combination with calomel, and the following form was ordered:

℞ Opii, gr. iv;
Hydr. chlor., gr. x.
In pilulas ij nocte maneque sumendas.

14th.—His symptoms were much mitigated by the pills, which were ordered to be continued. To-day galvanism was tried, one extremity of the wire being passed into the rectum, the other being applied to the abdomen and down the spine. Rather strong and painful contractions of the abdominal muscles were thus produced, without relieving

the bowels. The cold douche was again tried; but nothing more was done with the exception of administering 3 gr. of opium, night and morning, until the 15th, when an evident change was taking place in the condition of our patient; his strength and spirits had given way to depression and anxiety, the features were pinched and of a sallow hue, his tongue was coated with a dark dry fur, his pulse was become quick and rather feeble; vomiting had become almost incessant, and during the last three days the matters ejected were of a light brown colour and strong fæcal odour. It was now sixteen days since he had had the least evacuation per anum. All further efforts to prolong life by medical means were evidently useless, and it now only remained to propose to our patient the operation employed by Amussat for opening the descending colon.

Having told him of the present hopelessness of his case, the nature of the operation was explained to him, and he readily consented to its performance, with an expression of confidence in our efforts.

The same day, at 4 p.m., the operation was performed, in the presence of Dr. Fletcher, Mr. Crompton, Mr. Alfred Baker, and Mr. Clarkson. As the patient lay on his back no indication of the precise nature or situation of the obstruction was observable. The abdomen was equally swollen on both sides, presenting everywhere the same elastic resistance to pressure; the sound on percussion being generally clear, was duller as it approached the loins. As the patient lay on his belly no bulging was observable in the lumbar region of one side more than in that of the other; percussion elicited a rather duller sound on the left than on the right side. The patient being extended on a bed with his face downwards, a transverse incision was made on the left loin, beginning at the ridge which marks the external margin of the erector spinæ muscle (about two inches from the spine), and carried directly outwards. This incision was five and a half inches long, and was situated a finger's breadth above the crest of the ilium, it passed through the skin and fat nearly one inch in depth, down to the latissimus dorsi muscle.

This muscle, and the quadratus lumborum were now divided to the extent of the incision of the skin, and a layer of fat bounded on the inside by the external margin of the erector spinæ muscle was brought into view. On dissecting this away to the depth of about half an inch, a thin transparent membrane was exposed. From the appearance of this membrane, which it was conceived might be the intestine, it was thought advisable to pass sutures through it, to retain it in its position, and subsequently to affix it to the edges of the wound. However, on penetrating it with the knife, a mass of soft granular fat started through the incision. A very large quantity of this fat was cautiously dissected away, and the finger was then introduced to search for the bowel, but no precise indication of it could be felt; the finger, when pressed upwards, rested on the lower part of the left kidney, while downwards it came in contact with the inner margin of the crest of the ilium. The wound being now of considerable depth, it was necessary to proceed with great caution, and clear away the fat little by little, which proceeding, from the looseness of the nature of the fat, was rather difficult, and occupied some time.

At length the bowel was brought into view, at the depth of about four inches; it was highly vascular, and having been cleared of fat, sutures were passed through it and held by assistants. An incision half an inch in length was made into the bowel, and an immense quantity of light coloured fluid fæces immediately escaped. The patient had been vomiting similar fæcal matter during nearly the whole of the operation, but this vomiting now entirely ceased, and he was relieved of all his symptoms. The opening in the bowel was fastened by sutures to the skin; a large bread poultice was placed over the wound, and retained by a bandage passed round the body, the patient being enjoined to lie on the left side to facilitate the escape of the fæces. Scarcely two ounces of blood were lost during the operation.

16th, 9 a.m.—He is going on well in every respect. Has passed a much better night than any during his illness; has been prevented from sleeping much by the frequent

evacuations through the wound, which are now more tinged with bile. Countenance calm and clearer; tongue rather cleaner; no thirst; wishes for more solid food; has had neither pain nor vomiting since the operation; belly perfectly soft, and without pain on pressure. Pulse 100, soft. The wound looks exceedingly well, the opening in the bowel being exactly in its centre, the fæces escape very readily. A large bread and water poultice was applied to the wound. To take beef tea, thickened with oatmeal; gruel, &c.

4 p.m.—Continues improving; tongue much cleaner, a slightly brown fur only in the centre; pulse 94. Has no pain nor vomiting. Fæces less in quantity, and rather more consistent. Some orange taken this morning has passed through the wound.

9 p.m.—Has had an hour's very comfortable sleep since the last visit, from which he awoke rather restless and delirious; no other unfavorable symptom; pulse 98, soft and compressible. To have two table-spoonfuls of brandy in gruel, and should restlessness continue, to take two grains of opium.

17th, 9 a.m.—Fell asleep soon after taking the brandy at last night's visit, and continued to sleep till this morning, when he awoke considerably refreshed, and quite calm and comfortable; the opiate therefore had not been given to him. This was the first quiet and continued sleep he had had since the commencement of his illness; pulse 94, rather increased in strength; tongue moist, slightly brown in the centre, clean and natural in appearance at the margins; countenance clearer and more natural; belly soft and without any tenderness on pressure; has made a large quantity of urine of a clear and healthy appearance. The surfaces of the wound are rather pale; the inner half is gradually filling from the bottom, the outer half is still deep and more inactive; the sutures have ulcerated from the intestine, which is adherent all around to the surface of the wound, which is to be dressed with lint dipped in warm oil; the surrounding skin to be smeared with a stiff cerate of lard and white wax, to protect it from irritation from the

fæces. In the course of the day he had several hours' excellent sleep, and in the evening he expressed himself as "getting much better," the pulse being 90, full and strong, but readily compressible. Up to this time he had drank a large quantity of good beef tea, which was now ordered to be lessened.

18th, 9 a.m.—Has had several hours of comfortable sleep during the night, and expresses himself as feeling "very well, and getting up his strength," and wants more solid food; features have become perfectly natural and cheerful, tongue as before; pulse 86, rather diminished in strength and fulness since last night; strong pressure on the belly, which is soft, and of the natural size, produces not the slightest pain anywhere; has had several stools through the wound, but they are now become less frequent and more consistent, generally of a yellow, but occasionally of a green colour. No pain in the wound with exception of slight "smarting," probably from contact of fæces; the wound has a rather inactive appearance, and fetid odour; the probe readily passes to the depth of two and a half inches, and becomes blackened; to be dressed as before. To take flour pudding, rice pudding, milk, gruel, beef tea, &c. &c.

On examination of the wound at 8 p.m., it had a still more inactive appearance and fetid odour; its lips are swollen, and some hardness and redness exist around it, particularly on its outer half. It was now well syringed with a mixture of yeast and warm water, and dressed with small portions of lint dipped in warm olive oil, the surrounding skin being smeared with the cerate as before, and the whole covered with a bread poultice mixed with yeast. He expressed great comfort from this mode of dressing the wound. He has had a strong dry occasional cough during the last two days, which produces a considerable gaping of the wound, with a strong forcing of the bowel, and generally an evacuation of fæces. His tongue is drier than usual, and coated with a white fur; pulse 94, rather weaker than it was this morning; thirst not increased; he feels no pain, has slept comfortably, and expresses himself as continuing to

were temporarily relieved by the action of purgatives, as castor-oil, colocynth, and magnesia, which he frequently took, but previously to their operation they greatly aggravated the symptoms. The distress which followed his meals now became more severe, and was often followed by vomiting, his bowels being obstinately costive, his stools being more scanty and voided with greater difficulty; he states also that they were more fluid, but he had not noticed that their diameter was less than formerly. Nine days before my visit his complaint was becoming worse, and he could obtain only very small quantities of stools by repeated doses of purgatives. However, he had been able to continue his employment till within four days of my visit, when the natural action of the bowels entirely ceased; all his symptoms became greatly aggravated, and he took repeated doses of brandy and castor-oil with the only effect of adding to his sufferings and producing vomiting.

On my first visit I recollected having seen him three months previously, at which time he cursorily mentioned his being occasionally subject to what he called "the windy bellyache," but for which he did not require treatment. The abdomen was now greatly distended and tympanitic; pain was chiefly felt in the situation of the transverse colon, and was much increased by pressure, and at this part some bulging was also observed; he described the pain as of a "twisting" character, and shooting down to the umbilicus. At short intervals the pain was aggravated in violent paroxysms, accompanied with strong tenesmus, which continued about a minute, and then as quickly subsided. He vomited almost everything which he took. The pulse was rather increased in frequency, full, strong, and compressible. Tongue coated with a thick, pale fur, and not dry; much thirst. He was ordered to take immediately—Calomel, gr. v; powdered opium, gr. ij: to be followed by a black draught every four hours.

May 4th.—There was some temporary abatement of symptoms after taking the calomel and opium last night, but there is no improvement this morning; the vomiting

still continues, the abdominal symptoms are unabated, and there is no action of the bowels; the urine is scanty and high-coloured. The calomel and opium pill was repeated, and followed by an effervescing draught containing four drops of diluted prussic acid every three hours; and he took one table-spoonful of castor-oil in peppermint water every six hours. In the evening the pain and vomiting were much diminished; the pills and castor-oil had not been rejected, but the abdominal distension and tenderness were very great, and the bowels were still not acted upon; the rectum, so far as the finger could reach, was found perfectly healthy, and no obstruction could be felt. He was ordered to have a warm bath immediately, and afterwards an enema, containing castor-oil and turpentine, of each one ounce, to be given with as much warm water as could be injected. The pill containing calomel and opium, and castor-oil to be continued.

5th.—He passed a much better night after the bath, but this morning his symptoms have returned as severe as ever. More than a pint of the clyster could not be injected, and this returned immediately, the patient being unable to retain it from the painful feeling of distension it caused in the lower part of the belly; only a very small portion of scybalæ was brought away. The colon tube passed up the rectum to the distance of about eight inches. This morning, in consequence of the urgency of the symptoms, twelve ounces of blood were taken from the arm, to the approach of syncope, and the following pills were ordered:

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6th.—The blood drawn yesterday presented no inflammatory characters, the coagulum being neither buffed nor cupped; his symptoms were mitigated by the bleeding, but they have again become urgent. There is no action of the bowels, and vomiting is still frequent. Mr. Alfred

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parietal peritoneum opaque, thickened, and generally covered with lymph; the convolutions of the intestines adherent together, and covered with lymph; spleen healthy, kidneys slightly congested; the liver much thickened, and granular in texture; anterior margin of the liver greatly rounded, and adherent to the peritoneum by the whole of its upper surface. The strictured portion of the intestine was situated at the sigmoid flexure; it was about four inches in length and three fourths of an inch in diameter, throughout the whole extent of the contracted part. When cut into, the whole of this portion was found to be filled with a plug of apparently firmly coagulated lymph, which entirely obliterated the canal.

Having placed the diseased portion of intestine along with other morbid specimens in a jar of spirits of wine, intending it for further examination, I found after it had remained some time, that the plug had become broken up and detached from the bowel. On scraping the thin layer which remained from the bowel, the coats of the latter appeared contracted and slightly thickened, but were continuous, even, and in other respects apparently healthy, and not distinguishable in structure from their proper condition. In fact, with the exception of the contraction and slight thickening of the length above stated, there was no sign of disease in the coats of the bowel. The plug which existed in the contracted portion of the intestine seemed to be formed of successive layers of lymph or fibrine, or inspissated cancers. It exactly resembled the deposits which take place in the larynx in acute laryngitis.

The artificial opening, when viewed from within, was somewhat funnel-shaped, with the apex towards the integuments; it was contracted at the external orifice to the size of a small goose-quill. It appeared to be lined by mucous membrane. The side of the bowel opposite to the opening converged to the aperture so as to leave the entrance to the lower portion nearly obliterated. The lower portion of the intestine was much contracted, but the upper was rather dilated.

A CASE OF

COMPLETE INTESTINAL OBSTRUCTION,

ARISING FROM

DISEASE OF THE SIGMOID FLEXURE OF THE COLON AND THE RECTUM;

IN WHICH THE DESCENDING COLON WAS SUCCESSFULLY OPENED IN THE LOIN.

BY

JOSIAH CLARKSON, M.R.C.S.

OF BIRMINGHAM.

COMMUNICATED BY

JOSEPH HODGSON, F.R.S.

Received December 24th, 1849.—Read January 8th, 1850.

Betsey Field, aged 21, a robust, healthy-looking person, of rather phlegmatic temperament, consulted me on the 19th of July, 1846. She was then suffering apparently from a slight dyspeptic attack, complaining of pain at the epigastrium, flatulency, and nausea. The bowels had not been opened during the preceding five days. I prescribed for her a mixture, consisting of sulphate and carbonate of magnesia, with compound spirit of ammonia and mint water; she was also to take three grains of blue pill, and seven grains of compound rhubarb pill.

On the 21st she came to me again, with the symptoms unrelieved, and her bowels still unopened. She complained of headache, thirst, and general febrile disturbance. The pain in the stomach was not worse, nor was she at all sick. I ordered her to take immediately three grains of calomel, and seven grains of compound extract of colocynth; and also

a wineglassful of the compound senna mixture, every three hours.

On the following morning she sent for me early, and on my arrival I found her suffering considerable pain in the abdomen, especially about the umbilicus and left hypochondrium. The abdomen was slightly and evenly distended and tympanitic, and pressure upon its parieties increased the pain. She was distressed by constant nausea, but had not as yet vomited. The pulse was 110, full and strong; countenance flushed, and somewhat anxious; skin dry and hot; urine copious, but high coloured. The bowels had not been moved. She was ordered three pills, each containing half a drop of Croton oil; one of which was to be taken every second hour.

At mid-day I found her in much the same condition as in the morning, the oil having had no other effect than to increase the pain in the bowels. She was ordered to have immediately a colocynth clyster, to be repeated in three hours if it does not operate. Ten leeches were applied to the belly.

In the evening, I made an examination of the rectum, preparatory to administering the enema myself. The gut was empty as far as the finger could reach, and appeared to be free to that extent from any obstruction. The colon tube passed up easily a distance of about six inches, but further I could not, by any manipulation, succeed in introducing it. A moderate degree of pressure caused the instrument to twist round, and its beak to re-appear at the anus. I threw up about two pints of fluid, which produced great desire to go to stool, with considerable straining, but the fluid alone came away, and untinged with fecal matter.

These circumstances indicated pretty clearly the existence of some mechanical obstruction. Her general symptoms were also by this time aggravated, and began to put on a serious aspect. The abdomen was greatly distended, and the pain had so increased, that I feared peritonitis had

commenced. She had frequent desire to evacuate in the bowels, but could pass nothing, although she made great, and apparently involuntary efforts. Flatus moving about the bowels, produced loud borborygmi, and its motion could be felt by the hand; it appeared, both to the patient and myself, to stop abruptly in the left iliac fossa. She had vomited three times in the course of the day a quantity of bilious fluid, quite free from fecal odour. She was directed to have twenty leeches on the abdomen, and to take a draught containing twenty-five drops of Battley's solution.

Early in the morning of the 23d I saw her, in consultation with Dr. Bell Fletcher. She had been relieved by the leeches, and the sickness was arrested. The bowels still refusing to act, we made a careful examination of the abdomen and rectum. The former was further distended over its whole surface, but there was not any particular prominence in either flank. The pain upon pressure was considerable, especially in the left side, and it was to this spot the patient pointed as the seat of her disease. Percussion elicited a clear sound everywhere; examination per rectum revealed nothing more than on the previous day. I once or twice thought, when the finger was pushed up with some force, that I could feel a kind of bulging in the rectum, at its junction with the colon. All attempts to introduce the tube were futile, and fluids injected returned in a few minutes, bringing away nothing save a little mucus. On the whole, however, her symptoms were less severe than on the preceding evening. Pulse 110, moderately full; urine plentiful; skin hot and moist. We ordered her to take a table-spoonful of castor-oil every hour, as long as the stomach would retain it.

In the evening, she had taken five doses of the oil before she vomited; she tried more, but each dose returned immediately. In other respects she was much the same as in the morning.

24th.—She had passed a sleepless night, and had vomited

three times: the pain was not very severe, except on pressure.

Considering this was the tenth day since the bowels had acted, the constitutional symptoms were not of that severity which would warrant us in having recourse to so grave an operation as that for opening the colon, and we determined, therefore, to try every other means we could devise, which held out the slightest hope of success. These we considered to be—1st. The administration of large doses of opium. 2d. The cold dash over the abdomen. 3d. Injecting, with force, a large quantity of water into the rectum, and preventing its escape by pressure round and upon the anus. 4th. Galvanism.

Unhappily all these measures, though perseveringly tried for two days, proved of no avail. On the evening of the 26th she was considerably worse; the pain had returned with severity; vomitings of bilious matter were frequent, though nothing stercoraceous was ejected; symptoms of prostration were rapidly developing themselves, and the only resource was evidently in an operation, whereby the accumulated contents of the bowels might escape. At this juncture Mr. Hodgson saw the case, and fully concurred in the necessity for the operation, and urged its immediate performance. Accordingly, at half-past nine p.m., in the presence, and with the assistance of Mr. Hodgson, Dr. Bell Fletcher, Mr. Brindley, and other gentlemen, I opened the descending colon, through the loin, as directed by M. Amussat.

The operation was performed in the following manner: The patient was laid on her belly, upon a table covered with a mattress, and a pillow was placed under the lower part of the abdomen, in order to give prominence to the left flank. At the edge of the erector spinæ, and about two fingers' breadth above the crest of the ilium, I commenced the incision, and carried it outwards for about five inches, so that the centre of the wound thus made was midway between the anterior and posterior superior spinous processes of the

ilium.[1] The quadratus lumborum was soon reached, and its fibres carefully divided, as was also the aponeurosis of the transversalis muscle beneath it. A quantity of loose fat was next removed, and the intestine reached with very little difficulty, apparently not much distended. Four ligatures were passed through it, two of which were fastened to the upper lip of the wound, and two to the lower. The intestine was then divided longitudinally between them, giving exit to a large quantity of fluid fæces; very little blood was lost. The operation lasted twenty minutes, and almost immediately after its completion, the patient expressed herself as being greatly relieved. She was placed in bed on her left side, without anything being applied to the wound. I saw her again in two hours, and found the fecal discharge had been very profuse, and was still continuing. After all the dirt had been removed, a large soft poultice was applied to the side, and she was replaced in her bed in the same position as before. The operation had much relieved her, and her condition was in every respect satisfactory.

27th.—The discharge of fluid fæces had continued copiously all night; the linen placed beneath her being completely saturated; not less than three or four quarts must have escaped. The distension of the belly was gone, and the pain considerably diminished. She had enjoyed about two hours' good sleep in the night, and was much refreshed by it. Pulse 100, full and soft; tongue brown, but moist; general diaphoresis.

[1] Two fingers' breadth above the crest of the ilium, and midway between the anterior and posterior superior spinous processes of the same bone, is the spot beneath which the intestine will generally be found. This mode of finding the exact situation was first pointed out to me by Mr. Hodgson, at the time of the operation; and since then I have frequently proved its accuracy on the dead subject.

I take this opportunity of expressing the great obligation I am under to Mr. Hodgson for his most valuable suggestions and assistance, so freely given throughout the whole duration of the case. To Dr. Bell Fletcher also my warmest thanks are due, and are hereby rendered.

28th.—The fæces continued to escape the whole of yesterday, but not in the night. On the removal of the poultice this morning she had an evacuation through the artificial anus, the matter being less fluid, somewhat moulded, and of a very natural appearance. The cellular tissue of the wound looked black, and in the middle of it the opening into the bowel was very distinct, being surrounded by the everted mucous membrane of its natural colour. She had slept several hours, and was in every respect improving. The poultices were continued.

For several succeeding days I do not find in my notes of the case any circumstances of sufficient importance to require a special report. Without any untoward symptom, she steadily improved in her general health, and the wound gradually cicatrized and contracted, the opening into the bowel being of sufficient size to admit the index finger without any difficulty, and giving exit to three or four healthy stools daily.

Still there was not the slightest indication of the fæces escaping in the natural way. On the 18th day from the operation she voided three or four rounded lumps, which at first I imagined were scybalæ, but upon a careful examination they proved to be merely indurated mucus. At times she complained of much pain of a colicky nature, commencing about the left iliac region, and radiating thence over the abdomen, accompanied with urgent desire to go to stool. These feelings were most speedily relieved by administering enemata of warm water per anum, and also into the intestine by the artificial aperture. On these occasions I endeavoured to ascertain the seat of the obstruction, and was satisfied that it was situated about six inches from the anus, as a flexible tube passed through either orifice readily reached a distance corresponding with this measurement, but could not be got beyond.

In three weeks she was able, with a little assistance, to walk down stairs, and soon to take a part in household work; her appetite became good, and digestion was carried

on with energy, as was evident from the fact of her rapidly regaining her usual habit, and even presenting some degree of *embonpoint*. Her menstrual periods were regular, and the constitution seemed quite to have recovered from the shock of the operation and the antecedent illness.

For several succeeding months she was in a most satisfactory condition, capable of performing the duties and enjoying the pleasures of her situation in life; she was able to walk about the town, and no one meeting her would have supposed for an instant she had been the subject of an operation of this nature. She wore a pad over the orifice, supported by a bandage round the belly, and as she had an evacuation only when these were removed, the inconvenience resulting from the situation of the anus was much less than she had expected or I had ventured to hope.

Whenever, as sometimes happened, the fæces were retained for a day or two, or she suffered an aggravation of the pain which still occasionally troubled her, a dose of aperient medicine or the warm water injection would afford her almost immediate relief. The only difficulty experienced was the tendency to contraction which the opening into the bowel at this time began to exhibit, and which required now and then the use of bougies and other dilating agents.

At the expiration of ten months this contraction was becoming the source of very considerable annoyance, as it opposed a serious obstacle to the escape of the contents of the bowels. The evacuations gradually became less frequent, three, four, or five days intervening without one; and even then they were only procured by dilating the orifice and administering injections. The pains became more constant and severe, the appetite began to fail, general disturbance of the digestive process followed, producing emaciation and debility, and giving me considerable uneasiness as to the result.

In this condition it was evident there was but one indication to be fulfilled, namely, so to dilate the artificial anus as to afford free exit to the fecal accumulation. By the con-

tinued use of sponge tents and other appliances, a great increase in the size of the outlet was obtained; but, unfortunately, there was no corresponding increase in the quantity of matter evacuated.

From this time until her death she gradually became worse, suffering most severely from pain in the bowels and a violent sickness, which harassed her at intervals during the last six weeks of her life. Food, even of the mildest description, taken into the stomach produced excessive pain, to be relieved only by vomiting. The consequence of this was, that she rapidly emaciated, and soon presented the appearance of a person in the last stage of tabes mesenterica.

At this period I availed myself of the advice of several of my professional friends, and with their assistance endeavoured to dilate the external aperture, which by this time had contracted to the size of a goose-quill. I divided, with the scalpel, that part of the cicatrix which seemed most unyielding, introduced an enema tube, and succeeded in removing a considerable quantity of fecal matter; the aperture being preserved open by means of a hollow tube kept in it.

Notwithstanding these measures, which were perseveringly tried for a considerable time, the bowels refused to discharge their contents, the emaciation rapidly increased, and she eventually died on the evening of the 14th of September, 1847, *having survived the operation nearly fourteen months.*

Examination of the Body, twenty-one hours after death.—On cutting into the abdomen, about a pint of clear, straw-coloured serum escaped. The parietal peritoneum was of a dark mottled colour, and presented innumerable tubercles, of various sizes, thickly studded over its whole surface. It was also much increased in thickness. The peritoneum covering the intestines was in a similar condition; and, from the long-continued inflammatory action of which it had been the seat, the opposed surfaces of the convolution had become so

firmly adherent to each other, as to be separated only with the greatest difficulty. Adhesions of this character had also been contracted between the transverse colon and the liver, the spleen, and the stomach; on the right side the colon was also connected with the abdominal wall. The whole of these adhesions were remarkably firm and unyielding, almost approaching cartilage in their texture; and they thoroughly incorporated the surfaces of the abdominal viscera in one mass, not to be separated in many places without the scalpel. During life they must have greatly interfered with the peristaltic action of the bowels. The transverse and descending colon were empty and contracted, but the whole of the small intestines, up to the duodenum, were greatly distended with consistent fæces; the ascending colon also contained some fæces, but in this part they were more fluid in their consistence. The mucous lining of these parts of the alimentary canal was of a dark colour, and presented numerous patches of ulceration. The most healthy portion was some inches above and below the artificial anus.

A careful dissection of the parts involved in the disease and the operation, revealed the following conditions:—The obstruction was situated about six inches from the lower termination of the rectum, and on a level with the fundus of the uterus. It consisted of a dense cartilaginous substance, surrounding the intestine in this spot, and completely obliterating its canal. It appeared to have originated externally to, or on the outer surface of, the bowel, as this latter, at the point of obstruction, was pinched in, as though it had originally been tied with a ligature. This diseased structure was about the size of a pullet's-egg, the greater part of it being situated anteriorly, whereby it had pushed the fundus of the uterus forward, producing slight anti-version; it was also firmly connected with this organ. On laying open the bowel, and dividing the growth in a line corresponding with it, it was found that the channel was obliterated for the distance of half an inch, and this occlusion was so complete, as even now to prevent the possibility of establishing a communication between the upper

and lower portions of the intestine, except by the aid of the knife.

The appearance of the opening into the bowel from the loin was very satisfactory. Situated about six inches above the obstruction, it was sufficiently large to admit, with ease, the finger; the edges were rounded and smooth, and the mucous membrane, both above and below, was in a perfectly healthy state. The lungs were free from tubercles.

CHEMICAL RESEARCHES

ON THE

NATURE AND CAUSE OF CHOLERA.

BY

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ALTHOUGH numerous experiments were made upon the fluids of the human body, in those persons affected with spasmodic cholera, during the prevalence of the epidemic of 1832 in this country, yet it seemed desirable that a parallel and more comprehensive set of observations should be obtained during the recurrence of the disease in the winter of 1848-49. In pursuance of this object, the following investigation was commenced at the instigation of the Board of Health; and it is only matter of regret to the author, that in consequence of the pressure of other avocations, the experiments were not carried to the extent which was originally intended. Three objects have been principally kept in view in the following researches into the chemical nature of this remarkable disease:

1. The important constituents of the blood have been carefully examined upon such a scale, as to preclude the possibility of the results which were obtained depending upon mere manual dexterity. The fluids also ejected from the body under the influence of spasmodic cholera have been subjected to chemical scrutiny.

2. The blood and fluids, more particularly the former, have been compared with those of the same class of persons in health, and in some other diseases by new experiments.

3. Some attempts have been made to throw light upon the idea (naturally suggested by the first view of the progress of the disease) of the prevalence of a tangible poison in the atmosphere, which acted as the efficient cause of cholera.

The locality chosen for the investigation appears to have supplied as favorable opportunities of studying the disease as any in the kingdom, since it is believed that, in proportion to the population, a greater number of cases occurred in Glasgow during both epidemics than in any other town in Great Britain.

The results of the chemical investigation of this disease have led to the conclusion, that spasmodic cholera is divisible into three stages:—1. The *laxative* stage (stage of invasion of Annesley, diarrhœal stage of Dr. A. Buchanan), which appears analogous to common laxity of the bowels, depending probably on the transference or diffusion of water from the blood to the mucous membrane of the intestinal canal. 2. The *lymphatic* stage (leucorrhœal of Dr. A. Buchanan, second or advanced stage of Annesley, collapse stage of others), characterised by rice-water dejections, the composition of which more nearly resembles the lymphatic fluids secreted in many diseases into serous cavities than any other animal fluids with which we are acquainted. 3. The *biliary* stage (included in the second stage of Annesley, and identical with the cholerrhœal stage of Dr. Buchanan; stage of reaction of others), characterised by the return of bile to the intestinal canal, and the setting in generally of smart febrile symptoms.

For the sake of perspicuity, these stages will be taken up seriatim, and the analyses presented as much as possible in a tabular form, placed side by side with the results obtained from healthy blood. No chemical experiments were made upon the first stage of the disease, as, when properly managed in a medical point of view, it was usually of short

duration, and no opportunities occurred of experimenting upon it; the great object of attraction, both to physician and chemist, being the second or lymphatic stage.

For all the fluids used in this inquiry, the author is indebted to the kindness of Dr. A. Buchanan, Physician to the Clyde-street Cholera Hospital; and to Dr. M'Gregor, Physician to the cholera wards in the Infirmary. It was a fortunate circumstance which thus enabled him to possess the support of one friend, whose excellent paper on the subject of malignant cholera in 1832 first indicated the chemical bearings of the inquiry; and of another, whose researches in pathological chemistry are too well known to require any encomium from him. The figures preceding the numbers in the tables are those originally attached to the cases, and have been continued in order to prevent confusion or error in transferring them from the note-book. It may be proper to add, that the author studied the disease originally in India, when in the service of the East India Company; and that during the recent epidemic, he renewed his acquaintance with the disease in the Glasgow Hospitals, and personally saw most of the cases (and many others), the analyses of whose fluids are given in this paper.

The only chemical experiments on cholera which the author has consulted are those of Dr. Thomas Thomson[1] and Dr. Andrews.[2] The results detailed in these papers, although from a more limited number of analyses than those now to be described, are fully borne out, so far as they go, by the present experiments, and serve to show that the disease, in a chemical point of view, is sufficiently steady.

The method of analysis adopted, consisted in determining the water by evaporating a large quantity of blood, commonly from a quarter to half a pound, and drying it at a temperature of 300° until it ceased to lose weight in a platinum capsule. To prevent scorching, a piece of white paper is placed between the dry mass and the bottom of the capsule as soon as the blood has contracted from the sides of the vessel in which it

[1] Philos. Magaz., vol. xi, p. 347, 1832.
[2] Ibid., vol. i, N. S., p. 295, 1832.

was drying. Any tendency to charring is thus effectually obviated.

The dry residue, after being weighed, was ignited, and the salts remaining digested in water, to separate the soluble from the insoluble salts. The fibrin was determined by washing a weighed portion of blood in a cloth with a weak solution of common salt until the red globules had passed through; the fibrin was then further washed with a plentiful supply of pure water. The specific gravities were usually taken, except in the cases of the serum, by means of the hydrometer, as soon as the blood was drawn. As the object of the inquiry was to determine the condition of the equilibrium of cholera blood compared with that of health, no general attempt was made to ascertain quantitatively that of the more minute constituents of the blood. The disease is obviously attended with too great a disturbance of the system to be characterised merely by alterations in the lesser constituents. The facts are derived from above thirty-four cases.

Second or Lymphatic Stage of Cholera.

Examination of the Blood.

Specific Gravity.—A striking peculiarity in the blood of persons affected with cholera in the lymphatic stage is one which meets us at the very first step in the chemical inquiry, viz., the great augmentation in the specific gravity of that fluid. This is exhibited in the following table, in contrast with healthy blood obtained from healthy persons about the same period, and in the same class of society:

Table I.

Specific gravity of Blood.

		Cholera.	Health.	
			Female.	Male.
Case V.—1.	(Female.)	1074	1052	1054
2.	„	1068		
„ XI.	„	1065[1]		

[1] Dr. Macgregor, in 190 cases, often found the specific gravity as high as 1078.

TABLE II.

Specific gravity of Serum.

	Cholera.	Health.
Case V.	1058	1028
„ XIII.	1042	

Ratio of Serum to Clot.—The table shows that the aberration from health is not great; but this in some measure depends upon the increase in the weight of the serum, as indicated by its specific gravity.

TABLE III.

	Cholera.		Health.			
	Expt.		Female—Expt.		Male—Expt.	
Case XI.—Serum	1006 grs.	438	1123 grs.	423·9	1220 grs.	455·2
Clot	1290 „	562	1526 „	576·1	1460 „	544·8
	2296	1000	2649	1000·	2680	1000·

Constituents of the Serum.—In cholera it appears that the amount of water is inferior to that contained in healthy serum:

TABLE IV.

	Cholera.		Health.			
	Expt.		Female—Expt.		Male—Expt.	
Case XI.—Water	881 grs.	876	1008 grs.	897·6	1105·5 grs.	909·7
Albumen and Salts	125 „	124	115 „	102·4	114·5 „	90·3
	1006	1000	1123	1000·	1220·	1000·

Composition of the Clot:

TABLE V.

	Cholera.		Health.	
	Expt.		Male—Expt.	
Case XI.—Water	905 grs.	702	1035 grs.	709
Solids	385 „	298	425 „	291
	1290	1000	1460	1000

It appears, therefore, that in this case the amount of serum detained by the clot is nearly the same as in health. If the whole of the water in the clot be viewed as serum, then the composition of the clot in cholera and health is:

TABLE VI.

	Cholera.	Health.
Serum	801	793
Globules, Fibrin, and Salts	199	207
	1000	1000

Amount of Water and Solids in the Blood of the Lymphatic Stage of Cholera.

The following table was made by experiments, in which a quantity of blood was dried at the temperature of 300° F. until it ceased to lose weight. The first three columns give the exact result of the experiments in grains, and the last two columns the amounts reduced to a thousand parts:

TABLE VII.

	Water.	Solids.	Total Blood.	Per 1000 parts. Water.	Solids.
Case IV.—1st Bleeding—	1428	592	2020 grs.	707	293
2d „	2015	905	2920 „	690	310
„ V.—1st „	2322	1003	3325 „	698	303
„ VI. „	425	143	568 „	748	252
„ VII. „	1421	408	1829 „	777	223
„ VIII. „	1602	798	2400 „	668	332
„ XI. „	1786	510	2296 „	778	222
„ XIII. „	2544	950	3494 „	729	271
Mean of eight specimens . .				724	276
Healthy blood—Female	2104	545	2649 „	794·26	205·74
Ditto Male	2140	539·5	2680 „	798·7	201·3

In Case IV the first bleeding was made on the fourth day from the arm. The blood in the second bleeding was extracted from the foot, and the blood when drawn exhibited a slightly buffy coat. In Case V the blood was taken on the fourth day. In Case VI but a small portion of serum separated when the blood was allowed to stand in the usual manner, and yet the quantity of water in the blood is greater than in many other cases. In this patient the temporary influence of galvanism in rousing the action of the heart was well exhibited, but the effect, as in many other cases where it was applied, proved merely ephemeral.

In drawing up the preceding table every attention has been directed to secure the introduction only of such cases as were undoubtedly advanced to the collapse stage, but had not proceeded to the condition of reaction, or, as it is termed in this paper, the biliary stage. It is not always easy to point out the exact line of demarcation between the two stages of the disease, since the collapsed condition characterised by the subtraction of water from the blood may have ceased, and yet the biliary matter may not have commenced to flow; and a comparison of this table with that under the biliary stage will at once convince us of the rapidity with which the blood recovers its natural equilibrium in reference to the relation between its solid and fluid constituents.

For the reasons previously specified, the following cases have been separated and placed in a table by themselves, as the blood in these instances was taken from the heart—personally—as it seemed an interesting point to compare the blood, as it is described to be *tarry* after death, with the blood taken from the veins during life:

TABLE VII.*

	Experiment.			Per 1000 parts.		
Blood.	Solids.	Water.	Salts.	Solids.	Water.	Salts.
Case I.—2000 grs.	612	1388	15·	306	694	7·5
„ G.— 370 „	66	304		178	822	
„ H.— 672 „	292	380	6·9	433	567	10·26
Mean of three cases				305	694	8·88

The consequence fairly deducible from the eight observations enumerated in the table is, that in the lymphatic or collapse stage of cholera, the watery portion of the blood has diminished by at least 7 per cent.; so that if we were to consider with some physiologists, the total amount of the blood in the human body to approach 22 lbs., it would appear, that in the spasmodic cholera, at least $1\frac{1}{2}$ lbs. of the watery part of the blood have been extracted from that fluid and poured into the intestinal canal. This, however, is taking the most favorable view of the circumstances. But if we estimate the amount in some of those cases where the

diminution of fluid in the blood is at a minimum, then the per centage reduction will reach as high as 13. The disturbance in the natural balance of the constituents of the blood in this disease will perhaps be as well understood by taking the ratio between the water and the solids, and then comparing it with the same relations in the healthy condition:

Cholera—Relation of solids to water	. .	1 to 2·62
Health Ditto	. . .	1 to 3·91

During the prevalence of cholera, a specimen of blood, obtained by hemorrhage from the nose, was put into the author's hands by his friend Dr. Pagan. The patient laboured under an affection of the mucous membranes of the air tubes. It is the only specimen of blood which he has hitherto found to assimilate to that of the lymphatic stage of cholera:

TABLE VIII.

	Expt.	
Water . . .	139·9	692·30
Salts . . .	0·6	2·97
Globules, Albumen, Fibrin . . .	61·6	304·73
	202·1	1000·

In this case we have the relation of solids to water even closer than in the case of cholera:

Ratio of solids to water . . . 1 to 2·25

Amount of Globules, Albumen, and Fibrin in the Blood of the Lymphatic Stage of Cholera.

From the determination of the fact, that the quantity of solid matter in the blood is greater in the lymphatic stage of cholera than in health, it becomes important to inquire if the solids are equally present in the usual proportions, or in other words, if it be true, as has been asserted, that there is an increase of some of the solids of the blood and a diminution of the normal quantity of saline matter. This table is obtained by deducting from the solids in Table VII

already given, the amount of saline matter ascertained by experiment.

TABLE IX.

	Experiment.		
	Total Blood.	Globules, Albumen, and Fibrin.	Globules, &c. per 1000.
Case IV.	2020 grs.	575	284·69
„ V.	3325 „	970	291·78
„ VI.	568 „	140	246·70
„ VII.	1829 „	385	204·44
„ VIII.	2400 „	775	322·92
„ XI.	2296 „	495	215·47
„ XIII.	3494 „	923	266·33
		Mean of seven cases . .	261·76

Healthy Blood.

	Total Blood.	Globules, &c.	Globules, &c. per 1000.
Male . . .	2680 grs.	522·4	195
Female . .	2649 „	529·5	200

TABLE X.

Amount of Fibrin.

	Experiment.		
	Blood.	Fibrin.	Per 1000.
Case IV.—	2920 grs.	17	5·82
„ XIII.—	702 „	1·04	3·27
Mean			4·54
„ of healthy blood (Lecanu)			2·95

TABLE XI.

Amount of Globules and Albumen.

	Globules and Albumen.
Case IV.	278·87
„ XIII.	263·06
Mean	270·96
Mean of healthy blood (Lecanu)	200·55

Although we observe in this case some difference in the ratio of the solid constituents, as exhibited in the following

table, it is probably not sufficient to constitute an aberration from the normal standard of any value, since we find even in health variations in the amount of fibrin present.

TABLE XII.

	Fibrin.		Albumen and Globules.	Water.
Cholera . . .	4·54		270·96	724
Health . . .	2·95		200·55	790
Ratio in cholera	1	to	59·86	159
„ health	1	to	66·80	263
Differences			6·94	104

The preceding result is obtained by dividing each of the numbers by the amount of fibrin. There is strong reason to suspect, from the nature of the chemistry of the disease, as it will afterwards be developed in the course of this paper, that the colouring matter or globules will in some cases be preternaturally augmented, as we find frequently considerable discharges of albumen in the excreted fluids. But the relative decrease or increase of these two proximate principles must undergo great variations, as we not unfrequently find blood globules in the rice-water evacuations. Whether these be derived from the sanguineous circulation, or from the minute vessels of the mucous membrane over which the epithelium and mucous membrane have been abraded in the course of the disease, is doubtful. The appreciation of minute differences in the amount of these constituents is at present a desideratum in chemistry. In inquiring into the chemical constitution of the blood in health and disease, it is of more consequence to attend to the relation in which these exist to each than to their absolute quantity. This is obvious from a consideration of the equilibrium of the food, that is, of the relation subsisting between the proximate constituents; but which it is unnecessary to enter into here, as it has been elsewhere treated of at length in another work.[1]

In the preceding table, the fibrin appears to be greater in cholera, relatively to the other solids, than in health. To

[1] Experimental Researches, on Food, chapter ix.

preserve the exact ratio, the fibrin ought to have been 3·91. But to those who consider the mechanical method adopted for obtaining the fibrin, the difference between 3·91 and 4·54 may not appear abnormal. It may be stated, however, that the mean amount of fibrin obtained from four cases (including the two preceding and two other cases) introduced under the stage of reaction, was 3·65 per 1000 of blood; and that one of these cases yielded exactly 3·91 per 1000 of fibrin. From these facts, the conclusion seems legitimate, that so far as the organic constituents of the blood in cholera are concerned, the analyses which have been previously given lead to the inference that there is nothing abnormal in the amount of these organic principles; and that, so far as we have already proceeded with the inquiry, the disease, as affecting the blood, consists simply in a diminution of water.

Salts in the Blood of the Lymphatic Stage of Cholera.

We now approach a very interesting inquiry in the investigation of the chemistry of cholera; in reference to which much has been written, and much variety of sentiment prevailed. According to one view, cholera is characterised by a deficiency of the natural saline matter of the blood; and hence it has been recommended, that to make up for the removal of this constituent, a solution of common salt should be injected into the circulation. There is, however, an error here at the outset, in the recommendation of this practice without an accurate analysis of the salts which have been removed by the disease. For it is not probable, *à priori*, that one soluble salt should be removed from the circulation without a certain proportion of other saline ingredients. In order to throw some light on this question, the total amount of salts has first been determined, and then the relative quantities of insoluble and soluble matter, of which the total saline constituents consisted, have been ascertained, so as to determine in how far the saline treatment of cholera is founded on rational principles. In the following table will be found the total amount of saline matter in the blood of different patients:

TABLE XIII.

	Experiment.		
	Blood.	Salts.	Per 1000.
Case . . IV.—	2020 grs.	17	8·41
„ V.—	3325 „	33	9·92
„ VI.—	568 „	3	5·30
„ VII.—	1829 „	23	12·56
„ VIII.—	2400 „	23	9·58
„ XI.—	2296 „	15	6·53
„ XIII.—	3494 „	26·8	7·67
		Mean of seven cases . .	8·56
Healthy blood (female)	2649 grs.	15·5	5·81
„ „ (male)	2680 „	17·1	6·38

From these results it is sufficiently obvious, that the total amount of saline matter in cholera considerably exceeds the natural quantity, the ratio of the salts in healthy blood being to those of cholera blood as 1 to 1·4. There still remains the determination of the relative proportion of insoluble to soluble salts, or of the bone salts compared with those which are principally useful in the circulating and muscular fluids. The insoluble salts consist of phosphates of lime, magnesia, and iron; the soluble of chlorides of sodium and potassium, trisphosphate and sulphate of soda.

TABLE XIV.

		Salts.			Per 1000.		
	Blood.	Insol.	Sol.	Total.	Insol.	Sol.	Ratios.
Case V.—	3325	6·85	26·15	33	2·06	7·86	1 to 3·81
„ VIII.—	2400	3·45	19·55	23	1·43	8·15	1 to 5·7
„ XIII.—	3494	7·47	19·33	26·8	2·13	5·54	1 to 2·59
			Mean . . .		1·87	7·18	1 to 3·83
Healthy blood, female . .	2649	2·87	12·63	15·5	1·08	4·76	1 to 4·40
Do. male . . .	2680	3·41	13·69	17·1	1·27	5·11	1 to 4·02
				Mean . . .			1 to 4·21

From this table we infer, that the equilibrium of the saline constitution of the blood in cholera is decidedly disturbed; for while there is in the same quantity of blood a

larger amount both of earthy and soluble salts, there is a less quantity of the soluble salts in proportion to the earthy ingredients. The method of restoring the balance which has thus been interfered with would not be by adding more soluble salts, which are already in excess (as is apparent by comparing the various numbers in the sixth column), by upwards of one third, but by subtracting a certain amount of the earthy substances. It is not, however, to be supposed that any such mode of treatment could be attended with any benefit; for omitting the fact, that besides saline matter, albuminous substances also escape from the blood in this stage of the disease, it must be obvious, on even a cursory examination of cholera, that the condition of the blood is merely a symptom of the disease—an effect of some powerful atmospheric cause of which hitherto we have not been permitted to take cognisance. At the same time it must be admitted, that our knowledge of disease in general is in a great measure confined to the symptoms, and that it is only by a due consideration of symptoms by a progress of ascent, that we can ever expect to arrive at a knowledge of the cause of the symptomatic disturbance. From the preceding details, we are now enabled to construct a table which will afford a view of the average amount of the different constituents of cholera blood in the lymphatic stage. A parallel column of the ingredients of healthy blood from Lecanu is given for the sake of comparison:

TABLE XV.

	Cholera.	Health.
Water	717·8	790·00
Fibrin	4·5	2·95
Globules and albumen	268·8	199·55
Insoluble salts . . .	1·8	1·00
Soluble salts	7·1	6·50
	1000·0	1000·00

If we compare the relation of the inorganic to the organic constituents of the blood in these two columns, we shall observe that there is comparatively but a slight difference in the ratio in cholera as compared with health. The dis-

turbance in the equilibrium lies in the ratio between the soluble and insoluble salts:

Ratio of Salts to Fibrin, Globules, and Albumen.

Cholera	1 to 30
Health	1 to 27

The following table gives the constituents of the soluble salts in cholera in 1000 parts, but it must be viewed merely as an approximation, as, from circumstances, the results were derived from limited sources:

TABLE XVI.

	Cholera.	Health.		Health.	
Chlorides of sodium and potassium	1·71	3·66	Enderlin.	3·63	Marchand.
Trisphosphate of soda	2·21	1·47		0·72	
Sulphate of soda	1·01	0·16		0·52	
Carbonate of soda	0·61	0·31		0·94	
	5·54	5·60		5·81	

According to this table, the amount of common salt in cholera blood falls below that which is found in a state of health. In another experiment 1·46 of alkaline chlorides were obtained from 1000 parts of blood. But the preceding figures also show, that in different healthy individuals, the ratio between the individual soluble salts varies greatly. It was this fact which seemed to render a very elaborate analysis of the blood salts a work of supererogation.

Fæces in the Lymphatic Stage of Cholera.

The excrementitious matter in the collapse stage of cholera has attracted a large share of attention, and its remarkably liquid consistency has tended to originate much speculation regarding the nature, source, and consequently the character of the disease. The descriptive title of *rice-water* evacuations is peculiarly applicable to the matter excreted by the intestines in this stage of the disease; but it does not appear that their true nature has yet been deduced from accurate chemical experiments. The enormous quantities of fluid evacuated generally in this stage, although in some measure, perhaps, frequently exaggerated in description, by complication with the fluid swallowed by the patient,

to assuage the urgent symptoms of thirst, are sufficient to arrest attention, even irrespective of the violent throes of agony with which the disease is accompanied. The fluids are always characterised by the presence of what have been termed flocculi. These have generally been assumed to be coagulated albumen. But careful examination under the microscope has demonstrated these masses of organic matter to be chiefly epithelial scales, derived, without doubt, from the surface of the intestinal mucous membrane, as in the case of the excretions of infants at the breast. These fluids are almost always alkaline; in one instance, however, the fluid was strongly acid, after being kept for twenty-four hours, and on the removal of the cork of the bottle, a quantity of carbonic acid was evolved. It is quite possible that the fermentation was due to the presence of sugar in the intestinal canal, derived from milk, which was freely administered, in mixture with eggs, to the patients in the cholera hospitals of this city. The analyses of these fluids will be arranged in two tables. In the *first* will be placed those cases which afford the type of the most frequent rice-water evacuations, and the *second* will exhibit a view of those analyses where a larger amount of organic matter was present than usually occurs in the fluids excreted.

TABLE XVII.

Expt. Fluid.	Residue.	Per 1000 Parts. Sp. Grav.	Residue	Water.
Case A.— 500 grs.	5· grs.	....	10·	990
„ B.—7000 „	78· „	1010	11·1	988·9
„ C.—1000 „	15·9 „	....	15·9	984·1
	Mean per 1000 ...		12·33	987·66

TABLE XVIII.

Table of Organic Matter and Salts.

Expt.	Organic Matter.	Salts.	Per 1000. Organic M.	Salts.	Water.
Case A.— ...	5·	...	10·	...	990
„ B.— ·23	.	55·	3·3	7·8	988·9
„ C.—10·2	..	5·7	10·2	5·7	984·1
	Mean		6·75	6·75	987·6

Ratio of Solids to Water, 1 to 73.

The organic matter named in these tables generally consists of a greater or smaller amount of albumen; for on evaporation in vacuo, a whitish yellow residue was obtained, which, on being treated with water, yielded a solution, coagulating on boiling and by the addition of acids. Usually, the fluids, as evacuated, when allowed to settle, yielded, by boiling, or the addition of an acid, distinct evidence of the presence of albumen. The quantity, however, in true rice-water cases was generally insignificant. On comparing these results with the analyses of the various fluids which make their appearance in serous and mucous cavities, as a result of diseases, it would almost seem that the intestinal mucous membrane had in this disease assumed the functions of a serous membrane, since the liquid evacuated bears a close resemblance, in composition, to the fluids deposited in local dropsies, and does not correspond, as has been generally asserted, with the serum of the blood. It deserves attention, however, that the natural fluids of the mucous membranes bear a close resemblance to those of the serous tissues, inasmuch as they consist of an alkaline fluid, with a small percentage of salts dissolved in a large amount of water. The following table exhibits the parallelism of the fluids of the rice-water stools, and serous fluids, effused in hydrocele and hydrocephalus, together for the sake of comparison with the general constitution of the pure serum of healthy blood.

TABLE XIX.

	Salts.	Organic Matter.	Water.	Observer.
1. Serum.....	9·2	....	.....	Marcet.
2. Ditto	11·00	89·	900·	R. D. T.
3. Ditto.....	9·	....	.....	Lecanu.
4. Cholera Fluid..	6·75	6·75	986·5	R. D. T.
5. Hydrocele „	7·82	....	.....	Ditto.
6. Hydrocephalus	8·66	1·52	989·82	John Tennent.

It was from the analogy of these fluids, in reference to their chemical composition, that the term lymphatic has been given to this stage of the disease. The interesting researches

of Dr. A. Buchanan have demonstrated, that what are usually termed serous effusions are in reality lymphatic, since they all contain fibrin, which can be made beautifully apparent by mixing them with blood serum, or simply by the introduction of certain moist solids into them.

The nature of the salts in the rice-water evacuations is precisely similar to that of the saline matters found in the serous fluids of hydrocele and hydrocephalus. In one extract, B, there was found 3·15 grs. per 1000 of common salt, mixed with carbonate of soda, some lime, with earthy phosphate and alkaline sulphate. In another extract, C, there was 0·912 common salt; and in G, 1·66 of the same salt. The earthy phosphate was indicated by obtaining a precipitate, on adding ammonia to the acid solution of the salts of the fæces, and the alkaline phosphate, by obtaining distinct crystals of ammonia phosphate of magnesia when a salt of magnesia was added to the solution of the salts, after dissolving in it sal-ammoniac. The characters which have been now detailed apply to the usual rice-water dejections, but cases frequently occurred in which the amount of organic matter was much more considerable, although the proportion of salts was not materially augmented.

TABLE XX.

	Sp. grav.	Organic Matter.	Salts.	Water.
Case D.—	1021	59·	8	933
„ E.—	1010	20·98	7·35	971·67
„ K.—		52·5		947·5

In D the quantity of epithelial scales was great. When they were allowed to subside, the supernatant fluid was poured off, and exposed to a temperature of 212°. The whole coagulated into a mass in a manner corresponding with the serum of blood, and yielded a similar odour; thus exhibiting the presence of a large amount of albumen. From this character the fluid corresponded in some measure with blood serum; but still it will be observed, on a com-

parison with serum as given in the preceding tables, the albumen or organic matter in this fluid fell far short of that which exists in serum. And the same observation applies to the salts present in the two fluids. The following table shows, however, that serous or lymphatic fluids vary very considerably in composition. The experiments were made for the purpose of illustrating this inquiry:

TABLE XXI.

	Organic Matter.	Salts.	Water.	Sp. grav.	
Hydrocele fluid	97·4	6·8	895·8	1029	Mr. Carlyle.
„	42·4	7·1	950·5	1019	

In this table we find that the saline constituents approach even more closely than the previous data to the results obtained in cholera, although the albuminous matter varies. In a case of rachitis, the organic matters bore to the salts the relation of 1 to $5\frac{3}{4}$, which approximates the ratio found for hydrocephalus in Table XX. In E the fluid smelt alcoholic, and contained abundance of sugar, as indicated by the copper test. This constituent, it has been already stated, might possibly be derived from the albuminous mixture of eggs and milk, used as drink for the patients. In K the evacuation was derived from Case IV, in the table of the analyses of blood. It possessed a white gruelly aspect; and when evaporated to dryness under the vacuum of an air-pump, a residue was obtained which yielded to water a solution which was coagulated by heat and acids.

Urine in the Lymphatic Stage of Cholera.

When death occurs in this stage, the largest quantity of urine which we have seen taken from the bladder was about a drachm; but usually the secretion may be said to be totally suppressed. On testing the minute quantities which were obtained, they seemed to contain the ordinary constituents.

Third or Biliary (Reaction) Stage of Cholera.

Blood in the Biliary Stage.

As soon as the lymphatic stage has terminated favorably, and the patient is so fortunate as to reach the third stage, the blood begins to assume its normal condition. The following table exhibits the specific gravity of the serum in this stage:

Table XXII.

	Sp. grav. of Serum in Biliary Stage.
Case IX. . . .	1027·9
„ XII. . . .	1027·9
a. . . .	1028·9
b. . . .	1027·9
c. . . .	1026·3
Mean	1027·7

Health from 1027 to 1029.

From the next table we discover, that the remarkable diminution of the watery element of the blood is but of short duration. The violent ejection of the fluid contents of the intestines subsides, and a greenish or yellow matter is voided, much more consistent in its nature. At the same period, the amount of water in the blood begins to resume its normal proportions, and if the disease terminates favorably, the blood speedily acquires its natural composition.

Table XXIII.

Water and Solids of Blood in Biliary Stage.

	Experiment.		Per 1000.	
Blood.	Solids.	Water.	Solids.	Water.
Case IX.—2477 grs.	476	2001	193	807
„ X.—2096 „	437	1659	208	792
„ XII.—2353 „	495	1858	210	790
Mean of three cases . . .			203	797
Mean health—Male . . .			201·3	798·7
„ „ Female . . .			205·74	794·26
Mean—Lymphatic Stage .			276	724

In Case IX the patient was 62 years of age. The blood had a decided buffy coat—a presumption of abnormal oxida-

tion—and therefore of an inflammatory condition. In Case X, the blood was from the temporal artery, but mottled in appearance, as if imperfectly oxidated; a character which attracted frequent attention during the occurrence of cholera. In Cases IX and XII the specific gravity of the serum, it will be observed by Table XXII, was natural. In Case IX the following was the relation between the serum and clot:

TABLE XXIV.

	Expt.	
Serum . . .	1360 grs.	550
Clot	1117 „	450
	2477	1000

With regard to the composition of the serum and clot in Case IX, the following table yields the result:

TABLE XXV.

Composition of Serum and Clot in Biliary Stage.

	Expt. Serum.	Serum.	Expt.—Clot.	
Water	1200 grs.	882	808	723
Solids	160 „	118	319	277
		1000	1127	1000
Health.—Water		903		709
„ Solids		97		291
		1000		1000

From this table it appears, that the constituents of cholera blood in this stage and of healthy blood closely approximates; the differences being quite within the range of variations even in healthy blood.

TABLE XXVI.

Amount of Fibrin in Biliary Stage.

	Blood.	Fibrin.		
Case IX. . . .	2477 grs.	4	=	1·61 per 1000
„ X. . . .	2096 „	8·2	=	3·91 „
Mean				2·76
Mean of lymphatic stage . .				4·54
Mean of health				2·95

There is observable here great irregularity in the amount of fibrin, and the anomaly in Case IX of a diminution of fibrin over the healthy stage, instead of an increase, as usually happens in inflammatory complaints. But, probably, the great shock given to the system by such a depletory stage as the lymphatic, will afford a satisfactory explanation of the interference with the permanent equilibrium of this fluid.

TABLE XXVII.

Globules, Albumen, and Fibrin in Biliary Stage.

	Experiment.		
	Blood.	Globules, &c.	Per 1000.
Case IX.	2477 grs.	477	184·49
„ X.	2096	420	200·29
„ XII.	2353	479·8	203·54
Mean of biliary stage			196·10
Mean of lymphatic stage			261·76
Mean health			197·42

TABLE XXVIII.

Salts in the Blood of the Biliary Stage.

	Experiment.			Per 1000.		
	Blood.	Insol. Salts.	Sol. Salts.	Insol.	Sol.	Total Salts.
Case IX. . .	2477	4	15	1·61	6·06	7·67
„ X. . .	..	..	..	..	..	8·11
„ XII. . .	2353	2·5	12·7	1·06	5·40	6·46
Mean				1·33	5·73	7·44
Ratio in biliary stage . . .				1 to 4.3		
„ lymphatic stage . .				1 to 3·83		
„ health				1 to 4·2		

From the mode in which these tables are arranged, it is at once apparent, that the blood of patients in the biliary stage has regained the water which it possessed in the natural state. Indeed, it would seem that some excess of water is present, while the other constituents are rapidly regaining their normal relations to each other. This is well exhibited in the ratio of the two classes of salts to each

other, and also in the relative proportions of organic constituents and water.

Ratios of Fibrin to Globules and Albumen and Water.

Biliary stage . . .	1 to 68·7	288
Health	1 to 66·8	263

It must be, however, always borne in mind, that the patients from whom these fluids were obtained were all undergoing medical treatment, and were subjected to certain kinds of diet; the principal ingredient of which, however, was water. The mean composition of the blood in the biliary stage, according to the previous experiments, will therefore stand as in the following table, as compared with the lymphatic stage and with health:

TABLE XXIX.

Composition of the Blood in two stages of Cholera and in Health.

	Biliary Stage.	Lymphatic Stage.	Health.	
Water	800	717·80	790·8	Lecanu.
Fibrin	2·76	4·5	2·95	
Globules and Albumen .	190·18	268·8	199·5	
Insoluble salts	1·33	1·8	1·	
Soluble salts	5·73	7·1	6·50	
	1000·00	1000·0	1000 .	

It has been conceived by some authorities, that the stage of reaction bears a close relation to fever of a typhoid type. To ascertain if the chemical conditions of the disease would bear out this surmise, a specimen of blood was taken from a well characterised case of spotted typhus in the Infirmary of this city. The results of analysis give for the composition of typhus blood:

TABLE XXX.

Composition of Typhus Blood.

	Expt.—Typhus.		Biliary Stage.
Water	731·4	837·8	800
Globules, Albumen, and Fibrin .	145	158·79	192·94
Salts	3	3·41	7·06
	879	1000·00	1000

The idea of their identity is certainly far from being borne out. At the same time, it is to be observed, that in the reaction stage there is a decrease of the salts when compared with the preceding or lymphatic stage, while the water has increased above the natural state; and that these are the actual results, although much more extensive in degree, in typhus.

Fæces in the Biliary Stage of Cholera.

The biliary stage is introduced by the appearance of a green or yellow tinge in the evacuations. When the matter is dried in vacuo it loses a great amount of water, varying in the numerous trials which have been made in the present inquiry from 95½ to 36 per cent. The solid residue, when digested in alcohol, yields up a large proportion of substance soluble in that menstruum. In Case G, 1000 grains of fæces left 64 of residue. This gave up to alcohol 27 grains, which afforded a pink tint with sugar and sulphuric acid, although not a very striking indication; and when treated with muriatic acid, a small portion of resinous matter was deposited. From these characters it may be inferred that the fæces contained at least a trace of bile. In cases where death occurred during the biliary stage, the intestines were found to contain generally a considerable quantity of yellow feculent matter throughout the course of the small and large intestines. The fluid portion afforded an alkaline reaction, and through it were diffused white flocks.

TABLE XXXI.

Water and Solids in Fæces.

Fæces.	Solids.	Water.	Per 1000. Solids.	Per 1000. Water.	Ratios of solids to Water.
Case F.—1000 grs.	45	855	45	855	1 to 19
„ G.—1000 „	64	936	64	936	1 to 14·62
„ H.— 83 „	13·2	69·8	15·9	841	1 to 5·3
Mean . .			89	877	1 to 9·8
Lymphatic stage . .			13·5	986·5	1 to 73
Health—(Berzelius)			267	733	1 to 2·75
Cow—(R. D. T.) .			117	883	1 to 7·5

From this table it appears that there is great diversity in the ratios of the solid to the fluid constituents of the intestinal evacuations, even in animals in a state of health. But the remarkable contrast of all the preceding numbers with the evacuations in the collapse stage of cholera, is deserving of notice, and establishes a sufficient character.

TABLE XXXII.

Salts in the Fæces of Biliary Stage.

	Fæces.	Salts.	
Case F.	—1000	10	
Health	„	12	(Berzelius.)
Cow	„	17·5	(R. D. T.)

Urine in the Biliary Stage.

The urine was sometimes of a paler colour than the tint which it assumes in health; but generally no deviation from the normal state could be detected merely by an examination of the colour or consistence of the excretion. The specific gravity is, perhaps, somewhat lower than the standard of health.

TABLE XXXIII.

Specific Gravity of Urine in Biliary Stage.

Case V.	—1018	Fourth day of admission.
„ V.	—1017	
„ G.	—1016	Ditto „
„ H.	—1015	Sixth day „
„ I.	—1004	
Health	1019	

The healthy standard is here taken from a mean of 158 observations made by the author upon the urine of health. From this comparison we observe that the specific gravity of the urine in the biliary stage, except in one case, falls but slightly below the normal condition, perhaps the variation is not greater than happens in the same individual in one day. But, by the copious use of water, even in the healthy state, the lowest specific gravity may almost

be reached without the production of any other abnormal symptom in the system. In several cases albumen was found in the urine in this stage, although, on a post-mortem examination, we could observe no trace of granulation nor unnatural structure. In case G nearly five parts per 1000 were found of albumen, on the fourth day after admission. The albumen, however, soon disappeared in this and the other cases. In this case, however, the patient had been taking diuretics, and a turpentine enema had been administered.

TABLE XXXIV.

Water and Solids in Urine of Biliary Stage.

	Solids.	Water.	
Case G.....	32	968	containing albumen.
Health (Becquerel)	31·2	968·8	

From this comparison it appears that there is scarcely any deviation from the urine of health, except in the amount of urea, which is at first deficient. The occurrence of albumen in the urine is rather a remarkable symptom, connecting, as it does, cholera with scarlet fever, in the latter stages of which disease we have fluids effused into the cells, just as we have in cholera fluid effused, so to speak, into the intestines.

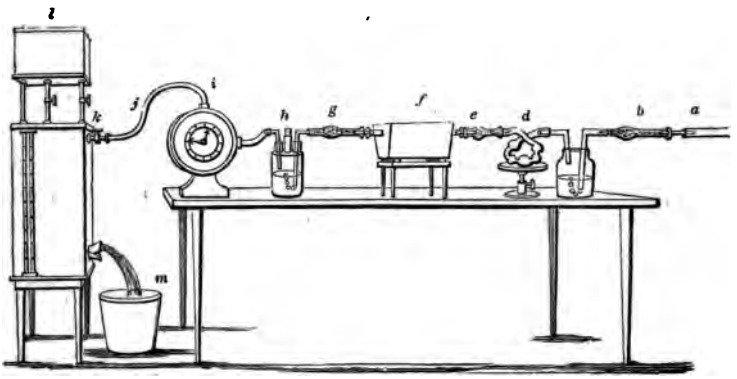
CONDITION OF THE ATMOSPHERE DURING THE PREVALENCE OF CHOLERA.

It has been a prevalent idea, that cholera is produced by some species of poison existing in the atmosphere. On many occasions this view has been advocated very much upon the principle adopted by the vulgar, of ascribing effects to certain causes, of the nature of which they are themselves not cognizant. Thus heat, light, and cold have all been called in to assist in the production of the disease; and, lastly, of the imponderables, electricity has been named as being more mysterious, and therefore more calculated to originate

uncommon effects. Others, startled at the wing-like progress of the disease, and calling into operation their imaginative powers, have traced in its awful visitations, a parallelism to the flight of insects, or locusts, of which high-coloured descriptions are plentifully found in the narratives of early eastern travellers. How old this theory may be is uncertain; but there can be no doubt that it was well understood above two centuries ago, under the patronage of Kircher, Langius, and others. The remark of Dr. Mead upon this theory may be equally applied to the others which have been noticed: "As it is a supposition, grounded upon no manner of observation, so I think there is no need to have recourse to it."

For the purpose of gaining either positive or negative evidence as to the existence of poison in the atmosphere, in infected districts, during the prevalence of cholera in Glasgow, the following experiments were instituted. The methods which chemistry can supply for the purpose, in the present state of our knowledge, must presuppose that the so called poison is a tangible organic body: such being the character of all animal poisons. It must be capable of acting on the circulating and nervous systems, otherwise it is not a poison, but must belong to some unknown category, respecting which it would be in vain at present to speculate.

To search for atmospheric poisons upon a minute scale would have served no purpose whatever. An apparatus was therefore arranged by which large quantities of air could be subjected to the influence of chemical reagents. The propelling or suctive powers by which the air was conveyed through the tubes was the common principle of aspiration. A large gas-holder was filled with water, and connected with a series of tubes through which the infected air passed, when the water was allowed to flow from the lower aperture of the gas-holder. The accompanying figure affords a view of the apparatus as arranged for the most difficult testings of the air:



a. Tube for conducting the infected air.
b. A tube filled with chloride of calcium to dry the air.
c. Bottle with water or barytes water.
d. Liebig's bulbs, filled with barytes water, or caustic potash.
e. Chloride of calcium tube.
f. Furnace for organic analysis, containing a Bohemian tube filled with oxide of copper.
g. Chloride of calcium tube.
h. Bottle with barytes water.
i. An experimental meter for measuring the amount of air passed.
j. A flexible tube.
k. A stop-cock uniting the meter with the gas holder.
l. Gas holder filled with water.
m. Vessel into which the water flows from the gas-holder when the stop-cock K is open.

The first series of experiments was made to ascertain if any solid body could be separated from a large quantity of air by passing it through acidulated water. The apparatus for this experiment simply consisted of tube *a* and bottle *c*, connected with the meter and gas-holder, or the tubes from *d* to *h* inclusive were omitted. The tubes were connected together by caoutchouc tubing, and these junctions were further effectually rendered air-tight by a coating of gun-cotton dissolved in ether (collodion), which appears to promise many advantages in delicate chemical manipulation. On removing the plug from the lower extremity of the gas-holder, and turning the stop-cock *k*, the air immediately passes through the dipping-pipe into the bottle *c*. The following table exhibits a register of the quantity of air passed during a number of days:

TABLE XXXV.

1849.	Air passed, in cubic feet.	Thermometer. Degrees.	Barometer.	Rain.
Jan. 16.	7	43·25	29·51	0·42 inches.
17.	16	45	29·33	0·12 „
18.	16	46	29·34	0·06 „
19.	20	47	29·60	34 „
20.	20	41·25	29·96	03 „
22.	21	44·5	29·50	07 „
23.	16	46·5	29·83	29 „
24.	7·4	47·75	29·70	01 „
25.	2·6	49·5	29·50	1·05 „
Total .	126	45·63	29·58	2·39 „
		Mean.		

The distilled water in the bottle *c* having been acidulated with pure muriatic acid prepared for the purpose, it was expected that any solid matter, if it existed in the atmosphere in any appreciable amount, would be condensed and entangled by the water. The acid was added for the purpose of detaining the ammonia. The water, after the expiration of the experiment, was apparently perfectly clean, and without deposit. It was evaporated by a gentle heat over a water-bath. No trace of turbidity or deposit exhibiting itself, the fluid was evaporated nearly to dryness, without exhibiting any appearance of precipitate, with the exception of an incipient saline crust. A small portion of an alcoholic solution of bichloride of platinum was now added, when a distinct yellow crystalline powder fell, which was thrown on a filter in the usual way, and washed with alcohol and ether. When burned, it left 1·81 grains of metallic platinum, which are equivalent to 0·313 grains of caustic ammonia. This quantity was, therefore, contained in 126 cubic feet of air, at the temperature of 45° 63, and pressure of 29·58 inches. When reduced to 60° F. and 30 inches of pressure, the bulk of this air becomes 124·236 cubic feet. When converted into weights, reckoning 100 cubic inches of air equal to 31·0117 grains, this 124·236 cubic feet will amount to 6,850,296·19 grains, or 978·5 lbs. avoirdupois. 1000 lbs. of air will,

therefore, contain 0·319 grains of caustic ammonia, or ·731 grains of carbonate of ammonia.[1]

In another experiment, the apparatus was arranged for the purpose of determining if any carbon or hydrogen existed in another form in the atmosphere, than as carbonic acid and water. The method consisted essentially (*see fig.*) in passing air through a tube filled with chloride of calcium (*b*), so as to deprive it of moisture, and enable the vapour in the air to be estimated; it then entered by a dipping tube into a solution of barytes (*c*), by means of which the carbonic acid was extracted; and for further security, it traversed a bulbed tube (*d*), also containing barytes. It was then dried by a chloride of calcium tube (*e*), and entered a tube filled with oxide of copper (*b*), heated to redness. If any hydrogen was present in the air in the form of a carbo-hydrogen compound, it was expected to become here oxidised and converted into water, which would be taken up by chloride of calcium (*g*). The air then dipped into a bottle (*h*) containing barytes solution, to take up the carbonic acid from the carbo-hydrogen compound, which would be oxidised by the oxide of copper. Thence it passed to the meter, where it was registered, and thence to the gas-holder, as already described. All the junctions of the tubes were rendered tight by means of caoutchouc and collodion.

The experiment was very satisfactory with regard to the carbonic acid in the atmosphere, as the precipitate of carbonate of barytes was apparent, and easily weighed; but no traces of water or carbonic acid could be detected in the chloride of calcium tube (*g*) beyond the oxide of copper; and in the barytes solution (*h*), although several feet of dry

[1] Since these experiments were made, Fresenius has published a set of experiments, in which he found the amount of ammonia in 1,000,000 grammes of air to be 0·098 grammes. The experiments above detailed make the amount of ammonia equal to ·045 gramme in 1,000,000 grammes of air—less than half the quantity found by Fresenius. This discrepancy may arise either from the two atmospheres being different, or from the rain which fell every day during the Glasgow experiments carrying down in solution a portion of ammonia to the earth.

air were passed through the ignited oxide of copper. A somewhat similar experiment was made by Boussingault, several years ago, upon the atmosphere of marshes. He came to the conclusion, that traces of carbon and hydrogen, in some form differing from carbonic acid and water, were diffused through the atmosphere over fens. If this were organic matter, it might have been derived from minute insects. But in the experiment now detailed this objection, it is conceived, was obviated in consequence of the air previously traversing two columns of fluid, which it was expected would detain any solid organic matter, whether vegetable or animal. The present experiment was made in the College Laboratory, the air being drawn from the street at a time when, in the neighbouring houses, persons were dying of cholera—in the centre of the city—a locality less liable to the diffusion of insects than the position examined by the French chemist. During the whole of the days when the experiment was carried on, a heavy mist existed, which, it is very probable, diminished greatly the amount of carbonic acid usually found in the air in dry weather. As the air, however, traversed three solutions, it is scarcely possible that any carbon could have escaped condensation.

The following table exhibits the results of the experiment:

TABLE XXXVI.

1849.	Cubic feet passed.	Thermometer. Degrees.	Barometer	Rain.
Jan. 27.	2·175	47·25	29·6 inches.	0·12 inches.
29.	0·55	39·75	29·91 „	0·30 „
30.	2·275	41·5	29·47 „	0·05 „
31.	..	41	29·90 „	0·32 „
Feb. 1.	1·875	39·5	30·01 „	0·00 „
2.	1·45	43·75	30 „	0·08 „
3. to 6.	1·75	45·5	30 „	0·00 „ „
7.	0·1	...	... „	... „
27.	0·3	40·25	29·76 „	... „
	10·475	41·06	29·83	·87 inches.

The amount of carbonate of barytes derived from 10·475

cubic feet of common air, or 84·27 lbs., was 5·78 grains, which contained 1·297 grains of carbonic acid, or 2·78 cubic inches.

The following are the conclusions which seem deducible from the previous experiments:

1. That the incipient stage of cholera does not differ materially from the common forms of diarrhœa, inasmuch as its treatment is successfully managed by similar means; and this result may lead to the inquiry,—Does not the removal of the symptoms of the disease by narcotics, and, therefore, the retention of the fluids in the system, afford an argument against the idea of a morbid poison being the cause of cholera?

2. That in the second stage of cholera, a lymphatic fluid is diffused from the blood into the intestinal canal, corresponding exactly in chemical composition with that secreted or diffused through the serous membranes in hydrocele and hydrocephalus, and other forms of dropsy. Compared with healthy blood, it appears, that the salt which has diffused most largely into the intestines, is common salt, while the albumen of the blood possesses this power of transference generally in a very limited degree. The facts seem to show, that in this stage, instead of as in the natural state, the diffusive power of the mucous membrane being exerted from the intestines towards the blood, the reverse action occurs; thus pointing to a parallelism with purely physical phenomena. Conjoined with other characters, they supply an argument for the inquiry,—May not cholera be an *epidemic intestinal catarrh*, influenza being an *epidemic respiratory catarrh?*

3. In the third stage the lymphatic fluid ceases to be poured out from the blood. The bile is excreted, and the normal diffusion from the intestines to the blood resumes its action.

4. There is no evidence of the existence of any organic body in the atmosphere during the prevalence of cholera,

and hence the inquiry is suggested,—May not this and parallel diseases which are not contagious, such as ague, be principally due to meteorological and physical influences, acting on debilitated habits, and thus a distinction be established between them and contagious affections produced by morbid poisons, as typified by small-pox?

CASE OF

STRICTURE OF THE ŒSOPHAGUS,

FATAL, TWO YEARS AND THREE MONTHS AFTER ACCIDENTALLY SWALLOWING SOAP-LEES.

BY

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Received September 2d.—Read November 13th, 1849.

THE following case appears to me to deserve attention, and to present some features of importance and interest, from its analogy to other recorded cases, in which a similar succession of symptoms and consequences have been observed.

Anne S., æt. 22, was admitted into Hallett Ward, Westminster Hospital, on July 16, 1847, suffering from great irritability of the stomach, frequent vomiting, and great prostration. The tongue was red, moist, and glazed. The pulse 84, small and weak; there was obscure tenderness or rather soreness of the abdomen, arising, apparently, from the frequent retching. There was no pain on pressure, except at the epigastrium. No tympanitis. Skin of natural temperature. Bowels not constipated. Deglutition painful, and followed by rejection of all ingesta, whether fluid or solid. Countenance expressive of exhaustion. She stated, that five days previously, she drank, by mistake, some fluid out of an old tea-pot, containing soap-lees, used in marble-polishing, (a caustic solution of impure carbonate of soda.) She did not swallow more than a mouthful, as she spat out the portion in her mouth on discovering her mistake. She does not appear to have suffered any pain at the time, or any other inconvenience, than the soapy disagreeable sensa-

tion in the mouth and pharynx, till near two hours after the accident, when severe vomiting commenced, which has continued, according to her statement, with but trifling intervals to the present time. She has had no advice.

The mucous surface of the tongue, cheeks, and pharynx, although red and injected, appeared merely denuded of epithelium; there was no indication of abrasion or ulceration.

An œsophagus tube passed readily into the stomach without any impediment, and without any more inconvenience than is usually experienced. She was ordered oleaginous laxatives and demulcents, calomel, and opium; a blister to the upper part of the sternum and throat; and milk and farinaceous diet. During the following twenty-four hours, the vomiting was less frequent; the medicines were retained, and deglutition became less painful and difficult.

On the 19th, three days after admision, pain was still felt at the epigastric region. The tongue had become paler and was moist. Deglutition was still painful, but the stomach had recovered its ordinary quietude and natural digestive powers: food and drink were retained; and a very marked improvement in her appearance was noticed. During the following week she steadily improved: complaining occasionally of pain at the superior margin of the sternum and between the shoulders; but the digestive functions appeared perfect. Appetite moderate; tongue of natural appearance; dejections healthy. She was discharged at her own request ten days after admission and fifteen after swallowing the alkali.

Eleven months from this period, on June 8, 1848, she was again admitted into the same ward, suffering from very urgent dysphagia. She was emaciated and weak, and looked like one half-starved. She stated, that for many weeks she had not swallowed any solid food, living on arrow-root, gruel, and broth; and that for the last eleven days, the difficulty of swallowing had become so great, that even fluids returned after being retained for a space, appearing to go no further than a spot to which she pointed at the edge of the sternum, and then coming back into her mouth. She stated also,

that a few weeks after she left the Hospital last year, she began to feel, occasionally, a difficulty in swallowing solids; that from time to time this inability increased, till she became content to live on spoon-food; that she always hoped it would get better; that she did not apply for relief from fear of losing her work; that during the last four weeks, the difficulty of swallowing had rapidly increased, and that for the last eleven days every species of ingesta came back again. She described her sensations of hunger and thirst as most intense and poignant,—the sight of food exciting the most distressing craving, rendered doubly distressing by her abortive efforts to swallow. The tongue was clean and moist; the pulse small and weak; excretions scanty, but natural; face pinched and emaciated; countenance expressive of distress and anxiety. The œsophagus was examined with a small gum elastic catheter, No. 8; some trifling obstruction was felt at a point corresponding to about an inch below the circoid cartilage; about an inch and a half or two inches from this spot, an impediment to the passage of the instrument presented itself, which it required steady and prolonged pressure to overcome. Beef-tea was injected to the great relief and comfort of the patient; who expressed in grateful terms the sensations of refreshing, glowing warmth, this supply of food imparted to the stomach, to which, in equal quantity, it had been for some months a stranger. A little port wine was subsequently injected. The catheter was passed again on the following day, but she was able to swallow beef-tea and arrow-root unassisted. The appearance of the patient had undergone a remarkable improvement; and her haggard look had passed into an expression of cheerful repose. A tube, gradually increasing in size, was passed daily. Deglutition improved, so that she readily swallowed every kind of fluid nourishment; but she could not obtain a passage for any solid portions of food.

On the fifth day from her last admission, an unsuccessful attempt to pass the tube through the lower stricture was followed by considerable pain about the pharynx and gullet, and also at the upper margin of the sternum and between

the shoulders. These symptoms yielded to blistering and taking calomel and opium; the tube was passed in the evening. The power of deglutition again improved; she increased in flesh and strength, and was made out-patient June 30, but neglected to attend: and about three weeks afterwards, July 18, was re-admitted, with aggravation of symptoms; pain referred to the sternum and between the shoulders. Blistering afforded relief. The tube was passed daily, and she recovered the power of swallowing fluid nourishment; but the state of the stricture would not admit of any increase in the size of the œsophageal bougie, as an instrument exceeding in size a No. 8 catheter would not pass. At the end of August she was made out-patient; and during the latter months of the year, was employed as one of the nurses in the Hospital. During this period, she was not able to swallow solids; this was subsequently ascertained, as she was not subject to any treatment while acting as nurse. She left in January.

On the 10th of September, 1849, she applied for admission for the fourth time; and now her symptoms and sufferings had assumed a more aggravated character than on any former occasion. She was much attenuated; there was extreme prostration; eyes sunken and hollow; countenance depressed and anxious; pulse small and weak; tongue white and moist. She stated, that for some weeks past the difficulty of swallowing had rapidly increased, and that within the last few days, everything she attempted to swallow was returned. She complained of much pain at the upper part of the sternum. The bougie met with some trifling obstruction at the upper third of the gullet, just below the circoid cartilage, which moderate pressure succeeded in passing; but on reaching the stricture below this, it could not be passed. The smallest sized wax bougies were ineffectually tried. Warm-baths and opium enemata were unavailing in allowing the instrument to pass. Blisters were applied; mercurial inunction tried; nutricious enemata injected up the rectum; nourishing fluids passed into the œsophagus, in the hope that a small portion might filter through if the stricture was not

completely impervious. Her sufferings from hunger, exhaustion, and thirst, were most pitiable and distressing; warm-baths temporarily relieved the latter. The stricture was situated so low in the œsophagus, that all hope from surgical assistance was unavailing. Incoherency and delirium supervened, and death from exhaustion and inanition put a period to her sufferings on 19th September, 1849.

Post-mortem examination.—Body emaciated to the last degree. The pulmonary and abdominal organs healthy. The stomach contracted and empty; mucous membrane pale and corrugated, contained soapy mucus; small intestines contracted and empty; large intestines distended with flatus.

On opening the œsophagus, the pharyngeal or upper third of the tube was much dilated and pouch-like; the mucous surface being puckered up into folds. The coats of the tube in its entire length were much thickened, the mucous and muscular coats particularly above the first stricture. At a spot corresponding in position to about an inch below the circoid cartilage, was the first stricture; a black bristle passed horizontally in the preparation[1] indicates its position: just below this, on the left hand, is the cicatrix of an ulcer about the size of a sixpence. The tube dilates again, and then contracts to about the diameter of a No. 8 catheter for nearly three inches, when it suddenly closes, and presents the appearance of complete obliteration of the canal; and a probe could not be passed from above downwards; a passage could be obtained only by passing the probe from below upwards. A black bristle passed vertically marks this stricture: the hollow spaces just above this stricture arise from the accidental tearing of the thickened muscular coat from the contracted portion of the tube.

The thickening of the walls of the gullet are seen to commence just above the first stricture, and to continue to the lower one, below which the œsophagus resumes its ordinary character. The larynx and trachea to the bifurcation have

[1] The preparation is in the museum of the Westminster Hospital.

been left, to show the relative position of the constricted and diseased portions of the canal.

This case affords an example of the succession of structural changes, slowly developed, and proceeding for a time without any very urgent symptoms, which may be expected to follow accidental swallowing of the caustic and carbonated alkalies. The same order of symptoms and similar pathological conditions of the œsophagus have been observed before, and seem common to all these cases. Inflammation is first excited; an impediment to perfect and easy deglutition is the consequence; every effort of swallowing is accompanied by pains and distress at the inflamed portion of the gullet. This inflammation is constantly renewed and maintained. Stricture follows; difficulty of deglutition results; increased obstruction perpetuates the inflammatory condition, surrounding textures become thickened; the stricture continues to increase, and finally becomes impassable; and the miserable patient at last dies, less from the morbid process itself, than by want of nourishment, or craving hunger and insatiable thirst continued unrelieved, and these, mocked by the ineffectual efforts for their relief, consign the poor sufferer to incoherency and delirium, and death ensues. And thus the fabled torments of the Lydian king for his filicidal impiety become virtually realised in the sufferings of modern humanity:

> "Nec bibit inter aquas, nec poma patentia carpit
> Tantalus infelix! quem sua fata premunt."

These accidents from swallowing soap-lees have been more frequent than is generally supposed; and, what is worthy of note, have, as far as the recorded cases enabled us to judge, uniformly produced like effects, if the patient has survived the accident for any length of time.

Sir Charles Bell[1] mentions a case of fatal stricture of the œsophagus, in which the patient died literally starved, who had accidentally swallowed soap-lees twenty years previously. And, again, in the same volume, that of a child who, in its

[1] Surgical Observations, vol. i, p. 80.

mother's absence, swallowed soap-lees, which produced inflammation and subsequently impassable stricture and total obstruction of swallowing. He gives plates of the morbid conditions of the œsophagus in these two cases, and relates a third case of a woman brought into the Middlesex Hospital, who had swallowed soap-lees, and who died of mortification of the gullet.

Mr. Cumin[1] has recorded a case of stricture of the œsophagus from swallowing a strong ley of American potash, mistaken for treacle. This case was successfully treated for stricture of the gullet by bougies, but required unremitted attention for ten months to restore deglutition to its healthy condition.

In the 'Edinb. Medical and Surgical Journal,' vol. xxx, p. 310, Mr. Dewar has recorded a case of fatal stricture of the œsophagus, and death by inanition from swallowing a strong ley of carbonate of potash, which in its details is remarkably analogous to the case now read to the Society. In a month after the accident, the inflammatory symptoms having subsided, the stomach retained ingesta. She was an intemperate woman, and after a night spent in drinking the first relapse took place. The dysphagia became very urgent: leeching, fomenting, and blistering, were resorted to; the bougie passed, and she recovered the power of swallowing. She suffered several relapses, seven in all; her strength gradually failed, and she died starved, being unable to swallow anything. The œsophagus was found thickened in all its coats, and contracted in its caliber, throughout the whole extent. The stricture was seated about two inches above the cardiac orifice, where it became so narrow that a probe could be scarcely passed: in several places the mucous membrane was destroyed by ulceration. These anatomical conditions are remarkably exemplified in the preparation before the Society.

The practical question, in considering these cases, is whether any other mode of treatment than that adopted, could be expected to avert these distressing and fatal consequences,

[1] Edinb. Med.-Chirurg. Transactions, vol. iii, part ii.

which appear almost uniformly to follow these accidents of swallowing the caustic and carbonated alkalies. The propriety of treating these cases, in the first instance, for inflammation of the gullet cannot, I think, be questioned; and leeching, blistering, and calomel and opium, when deglutition can be accomplished, are successful in relieving the earlier morbid conditions. But so soon as these are controlled, and before any positive symptoms of dysphagia present themselves, I should, in any future case, commence at once the daily use of an œsophageal bougie, and continue its daily employment for months, even in the absence of any symptoms for its necessity.

It will be observed, that in these cases, weeks and months often elapse without any palpable symptoms indicating any conditions favorable to the existence of stricture. There must, however, be some morbid circumstances progressively in operation, slowly, though imperceptibly, laying the foundation for the most hopeless stricture of this canal. No means appear to me so efficacious to avert this calamity, as the frequent, I would say daily, employment of the bougie; and, however troublesome or unnecessary it may appear to the patient, the example of these cases should convince us, that nothing but persevering in this course of treatment, can promise any chance of escaping the terrible consequences of organic stricture of this canal.

ON THE PROXIMATE CAUSE OF ALBUMINOUS URINE AND DROPSY, AND ON THE PATHOLOGY OF THE RENAL BLOOD-VESSELS IN BRIGHT'S DISEASE.

BY

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Received January 22d.—Read February 26th, 1850.

THE two communications on the subject of Renal Pathology, which the Society has done me the honour to publish in its Transactions,[1] had reference chiefly to morbid changes occurring in the *secreting cells* of the kidney.

Subsequent observations have confirmed the opinion expressed in those papers, that the various forms of disease which are generally included under the name *Bright's Disease*, and which are in most instances associated with an albuminous condition of the urine, have this common feature, that the first morbid change which can be detected in the kidney consists in an altered condition of the secreting cells.

Much light has, within the last few years, been thrown upon the process of secretion; it is still, however, in a great degree, involved in mystery. We do not yet possess a complete and accurate history of the secreting cells, of their development, decay, and reproduction, and of the exact process by which they separate from the blood and discharge into the excretory ducts the materials which constitute the secretions of the various glands. It appears probable, that a careful study of the pathological changes occurring in the gland-cells may throw additional light upon their healthy and

[1] Vols. XXIX and XXX.

normal action, and that in this, as in many other instances, the sciences of physiology and pathology may together produce results to which neither could attain singly.

Before entering upon the immediate subject of the present communication, it may be useful to mention briefly certain facts connected with the epithelial cells of the kidney.

1st. The true secreting cells occupy the inner surface of the convoluted tubes, those portions of the tubes which form the great mass of the cortical substance of the kidney. Neither the Malpighian bodies nor the straight tubes which form the medullary cones contain the true glandular or secreting epithelium.[1]

2d. No renal cells can be detected in normal and healthy urine. The presence of renal epithelium in the urine affords unequivocal evidence that the secreted products are abnormal. Thus, for example, when during an attack of jaundice the kidneys eliminate bile, the urine contains renal cells deeply tinged with biliary matter. The bile conveyed by the blood to the kidneys has so modified the secreting cells, that they are thrown off entire, and thus appear in the secretion. Various other matters produce a similar modified action of the secreting cells of the kidney,—the fever poisons, particularly that of scarlatina, of measles, and of erysipelas,—certain morbid matters which infect the blood of persons who have had repeated attacks of gout,—others which exist in the blood of cholera patients,—and, again, others which result from an insufficient supply of nutritious food. In these and in some other cases, which do not require special mention, although the poisons are recognised only by their effects, while their essential nature is unknown, there is yet abundant evidence to justify a belief in their existence.

3d. But it is not only by a process of desquamation that the kidney-cells afford evidence of their having eliminated abnormal products. The cells undergo various other modifications which can be detected by a careful microscopical examination of the kidneys after death. They are sometimes

[1] On the Structure and Use of the Malpighian Bodies of the Kidney. By W. Bowman, F.R.S. Phil. Trans., 1842.

gorged with oil, and this is a condition which may readily be detected by an examination of the urine during life, when, as frequently happens, the desquamative process accompanies it. In other cases the cells are remarkably opaque, and appear to contain an unusual quantity of a finely granular material. I have observed this condition in the kidneys of diabetic subjects, in which cases, probably, the long-continued secretion of sugar has modified the action and appearance of the cells. It is of the utmost importance to bear in mind, that there is a most intimate relationship between a secreting-cell and its secreted product,—there is reason to believe, that a change in one will be invariably accompanied by a corresponding modification of the other.

The various changes in the secreting-cells, just now enumerated, produce one common result; viz. an imperfect elimination of the renal secretion. The acute desquamative process rapidly fills the tubes with epithelial cells. The chronic desquamation destroys the life of the cells, arrests their reproduction, and leaves the tubes denuded.[1] The fatty engorgement of the cells tends to obstruct the tubes, and so to impede secretion; and probably each visible deviation from the normal appearance of the epithelial cells is attended by a corresponding imperfection in the performance of their function.

There are, besides, certain other morbid conditions, such as the replacing of the normal epithelium by a deposit of pus or unorganized fibrine in the tubes, which tend to the same result as the more common changes before mentioned. In every instance, excretion is imperfectly performed, and the urinary constituents are partially retained in the blood.

From these preliminary remarks, I pass on to the main subject of this communication, which is to offer an explanation of two of the most common and important symptoms of renal disease, viz. Albuminous Urine and Dropsy; and this will lead me to describe a remarkable pathological condition of the blood-vessels of the kidney, which, so far as I know, has not hitherto been noticed. The observations which

[1] Med.-Chirurg. Trans., Vol. XXX, p. 165 et seq.

I have to offer on this subject will, perhaps, be rendered more intelligible by a previous brief reference to one of those lucid and valuable essays bequeathed to us by the late lamented Dr. John Reid.[1] The essay to which I allude is that 'On the Order of Succession, in which the Vital Actions are arrested in Asphyxia.' The principal facts and arguments therein contained, and which concern us in our present inquiry, are the following:—when the trachea of an animal has been obstructed, by the insertion of a tube with a closed stop-cock, dark blood is at first transmitted freely through the lungs, and reaches the left side of the heart, by which it is driven through all the textures of the body. As the blood becomes more venous, its circulation through the vessels of the brain deranges the sensorial functions, and rapidly suspends them, so that the animal becomes unconscious of all external impressions. For about two minutes after the animal has become insensible, and when the blood in an exposed and unobstructed artery is equally dark as that in the accompanying vein, the large arteries become more distended and tense than before the stop-cock in the trachea was shut, and when the animal was breathing atmospheric air freely. At the same time, a hæmadynamometer being placed in the artery of one limb, and a similar instrument in the corresponding vein of the other, the former indicates an increase, and the latter a diminution of pressure, as compared with that observed in the same vessels before the air was excluded from the lungs, this evidently resulting from an impediment to the passage of the venous blood through the systemic capillaries. At the expiration of the time before mentioned, viz. about two minutes, the instrument in the artery indicates a diminution of pressure; the mercury, at first falling very gradually, and at last very rapidly, in consequence of the blood being arrested in the pulmonary capillaries, ceasing to pass through the lungs, and so stagnating in the right side of the heart and in the veins.

Dr. Reid then quotes some observations by Dr. Alison[2]

[1] Physiological, Anatomical, and Pathological Researches, p. 17.

[2] Pathology and Practice of Medicine, p. 120.

tending to show that the arrest of the blood in the pulmonary capillaries "is to be referred to an interesting law in physiology, by which the movement of nutritious juices is influenced by the chemical changes; or, as Dr. Alison terms them, the vital attractions connected with the chemical changes constantly going on in the capillary vessels between these juices and the surrounding tissues, by which nutrition and secretion are effected. Before arterial blood can be transmitted freely through any tissue or organ, it is not only necessary that the contractions of the heart be performed with a certain amount of force, but that the actions of nutrition and secretion be also in operation; so in the same manner, before the blood can be transmitted through the lungs, it is not only necessary that the right side of the heart retain its contractility, but that the chemieal changes between the blood and the atmospheric air should proceed." This doctrine is still further illustrated by Dr. Reid's experiment, before described, which demonstrates, that when the blood in the systemic circulation becomes decidedly venous, it passes less freely through the capillaries into the veins. Finally, Dr. Reid refers to some observations by Mr. Wharton Jones, which seem to accord with the explanation here given of the arrest of the pulmonary circulation during asphyxia. Mr. Jones observed, that when a solution of common salt, or a stream of carbonic acid gas, was applied to the lung of a living frog, the circulation of the blood was there arrested by the red corpuscles agglomerating together, and applying themselves here and there flat against the wall of the vessel. The same phenomena were observed, when a solution of common salt was applied to the web of a frog's foot.[1]

The observations and inferences of Drs. Reid and Alison seem to be applicable, by way of analogy, to the subject of renal disease, and will, I think, assist us in our attempt to arrive at the immediate cause of the albuminous condition of the urine and the general dropsy, which are so commonly associated with disease of the kidney.

[1] British and Foreign Medical Review, vol. xiv, p. 600.

In tracing the progress of a case of acute dropsy occurring as a consequence of scarlatina, it will commonly, but not invariably, be found that the patient has been exposed to cold. The natural process of elimination by the skin has thus been checked, and the poison is driven inwards to the kidney. It reaches the inter-tubular capillary plexus, and an effort is made to eliminate it by that modified action of the secreting cells which we have called desquamation. The cells are formed and shed rapidly and in large numbers; so that in the course of a few hours, many of the tubes may be completely filled by their accumulated solid contents. This condition of the tubes must obviously impede the secretory process; the blood is imperfectly purified, and excrementitious matters accumulate in it.

We have now to consider the influence which the materials, thus retained in the blood, exert upon the circulation through the kidneys.

Assuming that the renal circulation is affected by an imperfect elimination of the urinary constituents in a manner analogous to that in which the pulmonary circulation is influenced by the retention of carbonic acid in the blood, we should expect to find, that the circulation would first be retarded in the inter-tubular capillary vessels, the obstruction, which will be in proportion to the extent of morbid change in the contiguous tubes and cells, will, of course, exert an influence extending backwards in the order of the circulation; so that the Malpighian capillaries and the arteries which supply them will become gorged with blood. This engorgement is exactly analogous to that of the right side of the heart and venous system observed in animals after death from asphyxia.

There are certain facts which afford a remarkable confirmation of that which, as just now propounded, might seem to be a mere hypothesis, or at best only a probable analogy.

That the circulation through the inter-tubular capillaries is retarded, and that the Malpighian capillaries are consequently subjected to a greatly increased pressure and distension, seems to be indicated by the escape of serum and blood which so

constantly occurs during an attack of acute desquamative nephritis following scarlet fever. The serum flows into the tubes, mingles with the urine, and renders it highly albuminous; while the colouring matter and fibrine coagulate in the tubes, and afterwards escape in the form of cylindrical moulds, in which epithelial cells are commonly entangled. There seems no reason to doubt, that the blood, in these cases, escapes from the Malpighian capillaries, which lie within the dilated extremities of the tubes. The result is precisely similar to that obtained artificially by Dr. George Robinson,[1] who observed, that when a ligature was placed upon the renal vein of a rabbit, the urine became albuminous and bloody. Dr. Robinson performed this experiment several times, and with an almost uniform result.

But still more satisfactory and conclusive evidence of impeded circulation, and of the precise point at which the impediment occurs, is afforded by the condition of the renal blood-vessels in cases of chronic disease of the kidney.

I have observed in all cases of chronic renal disease, which I have examined since my attention has been directed to the condition of the blood-vessels, that the coats of the arteries and of the Malpighian capillaries are remarkably hypertrophied, while the coats of the inter-tubular capillaries and of the emulgent vein present no appearances of hypertrophy or thickening. I have examined the vessels in different cases, both injected and uninjected, and I have compared them with corresponding vessels in the healthy kidney, and the result has been uniformly such as I have stated. I will now detail the appearances which I have observed in each of these sets of vessels, viz. the arteries, the Malpighian capillaries, the inter-tubular capillaries, and the veins.

Arteries.—I have observed, in accordance with the description which Henle[2] has given of the arterial tunics, that the minute branches of the renal arteries have two fibrous coats, the inner being longitudinal, and the outer

[1] Medico-Chirurgical Transactions, Vol. XXVI.

[2] Allg. Anat.

circular; in the healthy vessel the inner coat is thinner than the outer, but in the diseased condition I have generally found them of nearly equal thickness. The two coats appear to be of the same nature, and in all probability they are

FIG. 1.—Portion of renal artery in the normal state, showing the relative thickness of its coats. *c.* Circular fibres. *l.* Longitudinal fibres. Magnified 200 diameters.

muscular. The thickening appears to be proportionally greater in the smallest arteries, *e. g.* the afferent vessels of the Malpighian bodies, and gradually diminishes in passing towards the arterial trunks. I have frequently observed the coats, at least three or four times exceeding the normal thickness. The canal of the artery is of the normal size,

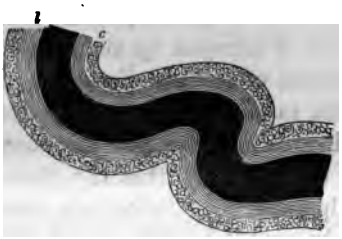

FIG. 2.—Portion of artery from a diseased kidney, showing great hypertrophy of its coats. *c.* Circular fibres. *l.* Longitudinal fibres. The canal of the vessel is filled with injection. Magnified 200 diameters.

and pervious until the last stage of this interesting series of changes; when, the secreting cells in the tubes being destroyed, and their vital attraction upon the blood ceasing, the circulation is arrested, and oil globules collect here and there in the canal of the arteries.

MALPIGHIAN CAPILLARIES.—What has been said of the arteries applies, with certain modifications, to the Malpighian capillaries. The capillaries do not, in the normal state, present a fibrous structure, nor is there any appearance of such tissue in the diseased vessels. The coats of these vessels are greatly thickened, but homogeneous in structure, and the canal is apparently normal, or perhaps slightly

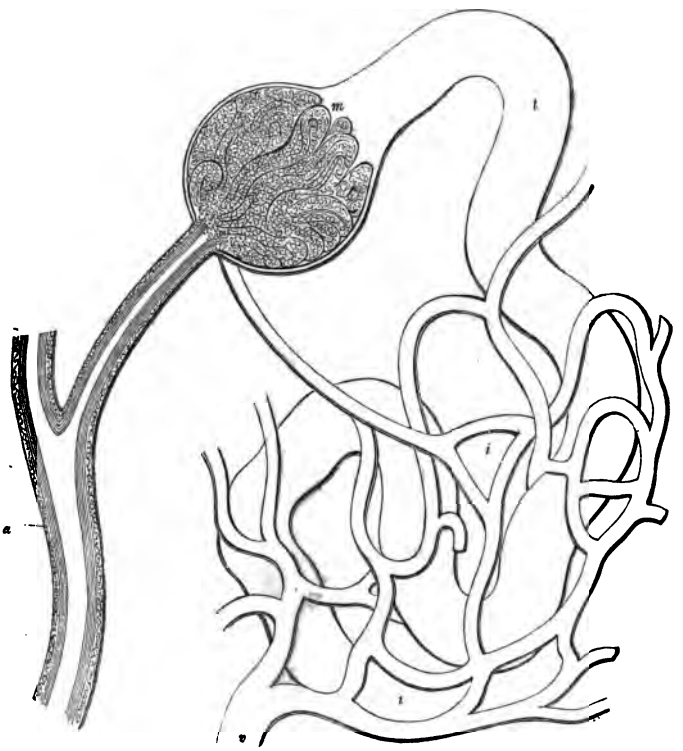

FIG. 3.—Plan of renal blood-vessels and uriniferous tube, showing thickening of the artery and Malpighian capillaries, while the inter-tubular capillaries and the vein present no appearance of thickening.

a. Artery. *m*. Malpighian capillaries. *i i*. Inter-tubular capillaries. *v*. Vein. *t*. tube.

narrowed. The injection sometimes fills the Malpighian vessels very completely, in other instances the tuft is only partially filled; and again, in other cases, the injection proceeds no farther than the termination of the afferent artery. The entire Malpighian body is not sensibly enlarged, but the increased thickness of the capillary walls produces a close packing and crowding of the vessels, so that their outline can scarcely be distinguished. The surface of the vessels is usually smooth and free from deposit, and the entire Malpighian body presents a peculiar whitish opaque appearance. A hasty examination might produce an impression, that the vessels are bloodless; and in the extreme stage they actually become so, presenting oil-globules in or

upon them, as already described in the arteries, the entire tuft being atrophied, and the capsule shrivelled; but in the majority of instances, the addition of acetic acid, by rendering the vessels transparent, will show the blood-corpuscles within them; thus proving, that the blood had been concealed by the opaque and thickened capillary wall, and that the Malpighian vessels must not be hastily pronounced impervious or bloodless.

INTER-TUBULAR CAPILLARIES AND VEINS.—The coats of these vessels present no appearance of thickening or of any

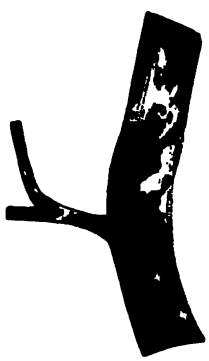

FIG. 4.—Portion of vein, with inter-tubular capillaries, from the same kidney as Fig. 2. The coats of these vessels present no appearance of thickening; the canal is partially filled with injection. Magnified 200 diameters.

other morbid change; they seem to be less numerous than in the healthy kidney, and they probably become atrophied and obliterated, in consequence of the arrested action of the secreting cells.

The pathological explanation of these changes in the renal blood-vessels appear to be this. There is an imperfect elimination of the urinary constituents, in consequence of changes in the secreting cells, produced by an effort which they have made to excrete abnormal products. Deficient excretion at once leads to impeded circulation,—the obstruction occurring at the very point where the excretion should be effected, viz. in the inter-tubular capillaries. The impediment reacts backwards upon the Malpighian capillaries, which in a sudden acute attack become ruptured, and allow the blood to escape into the urinary tubes; but when the

disease has been of longer duration, they become thickened, and permit only the serum of the blood to escape. The thickening of the Malpighian capillaries is probably preservative, and is intended to enable them to bear the increased pressure to which they are subjected during the continuance of the disease.

The thickening of the arteries, which proceeds simultaneously with that of the Malpighian capillaries, affords support to the opinion entertained by some physiologists, that the smaller arteries exert a propulsive influence upon the blood. The remarkable hypertrophy of the muscular coats of these vessels seems to have for its object to assist in driving the blood onwards through the inter-tubular vessels in which the impediment exists. Finally, the gland-cells being destroyed, and the process of secretion arrested, the circulation ceases, the tubular tissue wastes, and oil globules collect in the canals of the blood-vessels. This appears to be the order in which the various changes occur, and the probable relation which they bear to each other. So far as my observation has extended, the thickening of the vessels appears to be associated with all the forms of deposit in the tubes, and is in proportion to the degree in which the tubes and secreting cells are destroyed, as well as to the duration of the renal disease.[1]

In recent acute cases, the appearances just now described are of course not observed. Hypertrophy of the left ventricle is undoubtedly a common result of disease in the aortic valves; but we do not expect to find hypertrophy after a recent attack of acute disease producing a deposit on the valves.

The subject of renal dropsy appears now to demand a brief notice. Analogy would indicate the very great probability, that this form of dropsy is produced by an impeded circulation through the systemic capillaries, consequent upon the retention of the urinary constituents in the blood, and that the obstruction thus originating is similar to that which Dr.

[1] The best specimens for the examination of these changes are the small contracted granular kidneys, which have been the seat of that form of disease to which the term *chronic desquamative nephritis* has been applied. See a paper by the author, 'Med.-Chirurg. Trans.,' Vol. XXX.

Reid detected by the hæmadynamometer when black blood was circulating through the arteries of the animals which were the subjects of his experiments. There is one fact which, *per se*, is almost sufficient proof, that the systemic capillary circulation is actually impeded, in the way supposed, as a consequence of imperfect elimination of the urinary constituents. I allude to the frequent occurrence of hypertrophy of the left ventricle of the heart in cases of chronic renal dropsy, when there exists no obvious disease of the valves or vessels to account for such hypertrophy. The very frequent concurrence of cardiac and renal disease was long since pointed out by Dr. Bright.[1] In passing under review the chief morbid appearances observed in one hundred cases of renal disease connected with albuminous urine, Dr. Bright thus alludes to the subject of cardiac disease. "The deviations from health in the heart are well worthy of observation; they have been so frequent as to show a most important and intimate connection with the disease of which we are treating; while, at the same time, there have been twenty-seven cases in which no disease could be detected, and six others which, from not having been noted, lead to the belief that no important deviation from the normal state existed. The obvious structural changes in the heart have consisted chiefly of hypertrophy, with or without valvular disease; and, what is most striking, out of fifty-two cases of hypertrophy, no valvular disease whatsoever could be detected in thirty-four: but in eleven of these thirty-four, more or less disease existed in the coats of the aorta; still, however, leaving twenty-three without any probable organic cause for the marked hypertrophy generally affecting the left ventricle. This naturally leads us to look for some less local cause, for the unusual efforts to which the heart has been impelled: and the two most ready solutions appear to be, either that the altered quality of the blood affords irregular and unwonted stimulus to the organ immediately; or, that it so affects the minute and capillary circulation, as to render greater action necessary to force the blood through the distant subdivisions of the vascular system."

[1] Guy's Hospital Reports, vol. i.

The latter of the two explanations thus suggested by Dr. Bright, is the one to which analogy would point as the true one. The existence of capillary obstruction being admitted, dropsical effusion appears to be a natural and necessary consequence. It follows, too, that an albuminous condition of the urine, and dropsical effusion into the areolar tissue and serous cavities, must result from precisely analogous conditions, viz. an arrest of poisoned blood in capillary vessels. The hypertrophy of the renal arterial tunics, and that of the left ventricle of the heart, must also be considered as analogous means of overcoming an obstacle to the passage of the blood. It will be evident, that the dropsies here referred to are those which result from an abnormal condition of the blood; renal disease being the most frequent, but by no means the only cause of such abnormal condition. The dropsies produced by disease of the heart, or lungs, or liver, or by pressure on a venous trunk, differ in some respects from those before alluded to; they are all, however, alike in this one important particular—that *an impeded circulation precedes and accompanies the dropsical effusion.* There yet remain for brief notice some facts which, equally with those already mentioned, seem to indicate an impeded capillary circulation.

The first of these is the effusion into the air-cells of the lung, which occurs as a consequence of the imperfect aeration of the blood after division of the pneumo-gastric nerves. This was repeatedly observed by Dr. Reid during his experiments on the eighth pair of nerves. The same condition is found after death by slow asphyxia, consequent on an injury of the spine, which has paralysed all the respiratory muscles, except the diaphragm.

The hypertrophy of the right ventricle of the heart, so commonly observed in connexion with chronic bronchitis and asthma, probably depends upon a similar cause, viz., imperfect aeration of the blood, and a consequent impeded circulation through the pulmonary capillaries. Another instance in which the same law appears to operate is afforded by the sudden arrest of the circulation produced by the admission of air into

the veins. It appears that the pulmonary capillaries refuse to transmit the strange mixture of air and blood which is sent to them, and death is the immediate result.

The frequent connection of cerebral hemorrhage with renal disease is another fact closely related to those already mentioned, as also the occurrence of what is sometimes called serous apoplexy. Both these phenomena are, in all probability, associated with impeded circulation through the cerebral capillaries. With reference to some of these points, I may probably, ere long, have some additional evidence to offer. The subjects to which I have thus briefly alluded, are of wide extent and of vast importance, from their bearing upon the general doctrines of disease. I have endeavoured in this, and in my last communication, to trace the steps of what may be considered strictly inflammatory diseases of the kidney. If the facts are true, and the inferences just and rational, they must be applicable in a greater or less degree to the diseases of other parts; and we may hope, from a careful study of the kidney, presenting as it does facilities for pathological research, which do not exist in the case of any other organ, to obtain a light by which to remove the gloom now hanging over some of the most serious diseases with which we have to deal. In conclusion, I cannot refrain from a respectful mention of the name of William Bowman, to whom we are indebted for the accurate knowledge which we now possess of the Anatomy and Physiology of the Kidneys, —this being the only sure basis upon which to build up the pathology of the organ. To remark upon the debt of gratitude which the profession, and, indeed, all mankind, owe to Dr. Bright, would appear as presumptuous as needless; since it is universally acknowledged, that the results obtained by those who have followed in the track which he opened to them, have served only to enhance our estimate of the important discoveries made, now more than twenty years since, by that eminent physician.

Finally, I have to express my obligation to my friend Mr. H. H. Salter, to whose kindness I am indebted for the illustrations which accompany this communication.

ON

FATTY DISEASES OF THE HEART.

BY

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COMMUNICATED BY

C. J. B. WILLIAMS, M.D. F.R.S.

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THE subject of Fatty Diseases of the Heart was brought under my notice five years ago, by the sudden death of a gentleman, in whose body no sufficient explanation of that event could be found. A peculiar fatty condition of the heart was observed and recorded during the examination. The occurrence, soon afterwards, of two similar cases, led to the conclusion, that the presence of this fatty matter in the heart's texture bore some important relations to the structure and functions of the organ.

On referring to books, they were found to afford but imperfect information on the subject, and to contain very contradictory statements. The investigation, the results of which are herein comprised, was then commenced, and continued at such intervals as other avocations and the materials required permitted. Since the period referred to, the attention of other inquirers has been directed to the subject, and some most interesting and valuable essays have been published upon it. These essays, and I hope nearly all that had been previously written on the subject, I have examined with care; I have compared my own observations with their contents, when possible, and I shall with pleasure acknowledge in the course of this Essay any information thus

derived. The pursuit of the inquiry has been both pleasing and instructive to myself; and it is with the hope that the Fellows of this Society may derive the like feelings from the exposition of its results, that they are now respectfully submitted to their consideration.

The following appears to be the most convenient form for the arrangement and consideration of the subject:

I.—*The varieties of Fatty Diseases of the Heart, and their respective characters.*
II.—*An account of preceding observations on these Diseases.*
III.—*A consideration of the circumstances under which they occur—their causes.*
IV.—*Their effects on the Structure and Functions of the Heart.*
V.—*Their Symptoms and Diagnosis.*
VI.—*The Indications for their Treatment.*

Appended will be found Tables containing the abbreviated histories of eighty-three cases, in which fatty disease of the heart existed. Of these cases twenty-five are derived from original sources,[1] and the others from different publications, with additions, in several, derived from inquiries made of the authors. Drawings illustrative of the morbid conditions described are also annexed.

I.—THE VARIETIES OF FATTY DISEASES OF THE HEART, AND THEIR RESPECTIVE CHARACTERS.

There are two forms under which fat presents itself as a disease of the heart. In one of these forms the fat, composed of large cells containing oil, identical with the fat found in other parts of the body, grows upon and extends

[1] I have to express my most sincere acknowledgments to the kind friends whose names are appended to the several cases which they have given me. A few of the cases thus obtained have appeared in the journals from time to time since they were placed in these tables. Mr. Paget's and Dr. Ormerod's valuable cases have been published so recently, and in so distinct a form, that I have not taken the liberty of introducing any of them here.

over the surface of the heart; it then encroaches on, and insinuates itself between, the muscular fibres, in some cases to such an extent as to completely conceal them when the examination is made with the unassisted eye. In the other form of disease, a fatty matter, composed of granules and small oil-globules, occupies and fills the sheath of what was previously muscular fibre. In the one form of disease fatty tissue *grows* on and outside the fibre, in the other the muscular fibre itself *degenerates* into molecular fatty matter, (compare figures 1, 2, 3, 4, Plate III.) A distinction thus broadly marked in the anatomical characters of these two forms of disease, and in their mode of origin, requires to be clearly expressed in the designations given them. It will, therefore, be well to apply the term *fatty growth* to all cases in which fat tissue constitutes the morbid condition, even though it may encroach so far on the muscular fibres as to cause their apparent transformation into fat; whilst the term *fatty degeneration* will be limited, as in strictness it should be, to those cases in which the muscular fibre degenerates into molecular fatty matter. The necessity for this distinction will be evident as we proceed.

a. Fatty growth on the heart.—The fat found external to the heart's fibres consists, as already stated, of oily matter contained in cells, and is nearly identical with the fat in other parts of the body. These cells are found oval, spherical, or polygonal, the forms being dependent on accidental circumstances, and when full-sized they measure about $\frac{1}{500}$ of an inch in diameter. The yellow tissue composed of these cells, blood-vessels, &c., is first seen, and is always most abundant in the groove between the auricles and ventricles. The distribution of fat here bears a relation, as it does in other parts, to that of the blood-vessels. Thus it first appears in the course of the primary branches of the coronary vessels, then in that of the secondary branches, that is, in the groove over the septum, which marks the boundaries between the ventricles, and lastly follows the distribution of the smaller lateral branches. These branches are more superficial over the right ventricle than over the left, hence

the right is always found first and most abundantly covered with fat. A fringe of this substance is also found at the apex of the heart and frequently around the margins of the auricles. The course of the fat has been described by Senac,[1] Haller,[2] Laennec,[3] M. Bizot,[4] M. Rokitansky,[5] Mr. Paget,[6] and others. The fat may so completely envelope the heart, that none of the muscular tissue can be seen on its external surface. A mass of fat of this nature may of itself be sufficient to oppress and embarrass the heart's action; but fat rarely exists in such abundance on the surface of the organ without insinuating itself between and encroaching on the heart's fibres. In this way the muscular parietes of the organ become thinner and thinner, until the columnæ carneæ appear to arise from a mass of fat, as they are described to do by both Laennec and M. Bizot. This state constitutes what some writers have regarded as fatty degeneration, what M. Rokitansky has called "fatty metamorphosis," but which is, in reality, nothing more in many cases than an hypertrophy of fat. In hearts or parts of hearts less affected, that is where the fat is not very abundant, simple striæ of yellow tissue will be observed lying amongst the fibres. This appearance is common in the auricles.

When portions of the heart suffering from fatty growth in a high degree are examined with the microscope, it will be found, that where the growth is most advanced, that is always the external surface, few muscular fibres can be seen, and the wide intervals between them are occupied by fat cells. (See fig. 4, Plate III.) Proceeding inwards, we find the fibres become more evident, the fat cells fewer, and finally we have the fibres beneath the endocardium with a

[1] Traité de la Structure du Cœur, 1749, vol. i, p. 187.

[2] Elementa Physiologiæ, 1757, lib. iv, sec. 3, p. 324.

[3] On Diseases of the Chest. Translated by Dr. Forbes. 4th edition; London, 1834, p. 583.

[4] Mémoires de la Société Méd. d'Observation; Paris, 1837, vol. i, p. 351.

[5] Handbuch, der Pathologischen Anatomie. Von Carl Rokitansky. Wien, 1846, band iii, p. 459.

[6] Medical Gazette, vol. ii, 1847, p. 229.

few cells lying here and there amongst them. It is deserving of attention, that the fibres, even though they are overwhelmed with fat, may still retain their organization, (see fig. 4, Plate III;) but in all cases, the course and direction of the fibres are more or less modified and distorted. Thus, then, there is of necessity neither a degeneration nor metamorphosis of the muscle, but a growth or hypertrophy of fat upon it, though in many cases some of the fibres will be found degenerated. The fibres still existing, though concealed, explain the persistence of the heart's action in those cases in which the muscular walls appear to a greater or less extent replaced by fat.

A curious appearance, sometimes presented by the fatty tissue forming little masses within the heart, should be mentioned here. These little masses appear beneath the endocardium, and are raised above the surface of the ventricle. They are in size from that of a pin's-head to that of a pea, and they have been accurately described by Lancisi,[1] M. Bizot,[2] and Dr. Peacock. I have seen these little fatty tumours in two cases. There was a considerable but not an excessive amount of fat on the surface of the heart in both these cases.

b. Fatty degeneration of the heart's texture.—The general characters of this morbid change will be more readily comprehended after the alterations which the fibres undergo, as shown by the microscope, have been described. When a portion of the heart thus diseased is examined, the first thing which meets the eye is a want of the transverse striæ which mark the fibres of all the voluntary, and less distinctly those of the heart amongst the involuntary muscles. When a portion of the object in which the disease has but commenced is examined, it will be observed, that in addition to the faintness with which the cross markings are seen, a number of dark small dots stud the fibres in many points, evidently situated within the fibre. A few such dottings do not appear inconsistent with a tolerably healthy state of fibre, and they are frequently found in hearts which have well performed their

[1] De Motu Cordis Romæ, 1728, p. 55.

[2] Mémoires de la Société, &c., p. 357.

functions. As the observer, however, approaches the seat of more decided disease, he finds that the cross markings have in many points disappeared, and that the black dots have increased in size and number; some of the dots are now found to be transparent in the centre, and to assume some order in their arrangement. Sometimes the centre of a fibre is occupied by a long row of opaque points, forming a continuous line in the course of the filament, sometimes two or three lines lie side by side, the dark lines being broken by transparent apertures or circles. Less frequently the lines lie transversely to the fibre. These appearances are well represented in fig. 3, Plate III. Thus may be traced, as Mr. Paget has described, the change from the particle of molecular fat, the black dot in the fibre to the large oil globule with its transparent centre. These granules and globules become more numerous, they finally occupy the whole fibre, and cause it to present the appearance well shown in fig. 2, Plate III, or in a still more marked manner by a higher magnifying power, and in a more advanced form of disease, in fig. 1, Plate IV. The fibres, then, as shown in fig. 2, Plate III, present much the appearance of, and cannot be compared to a more like object, than the tubules of the kidney, when the cells of that organ are the seat of fatty degeneration. This fat, be it remembered, is not in the ordinary fat-cells, such as are found on the surface of the heart or amongst the fibres. The fat globules placed within the fibre are much smaller, appear to have a mere albuminous envelope, and are extremely like the oil globules of milk. They often escape from the broken fibres, float as free oil globules, or lodge between the fibres, and give the appearance, as M. Rokitansky believed, of being partially placed external to them. Mr. Paget and Dr. Ormerod have fully confirmed the observation, that they are situated within the fibre itself. It will be further observed, that the diseased fibres are so friable, that they break up readily into small disunited fragments or short masses. In making a section, it is sometimes possible to obtain a small diseased point occupying two or three fibres surrounded by tolerably healthy texture. In such a specimen the whole series of

changes may be followed until we arrive at the centre, where the disease is fully developed, and where we find the fibre broken up, and the field almost entirely occupied by oil globules. The size of the globules of fatty matter rarely exceeds that of the blood corpuscles, that of the black dots may be, in the first instance, not more than one tenth of this measurement. That these particles and globules are composed of fat is demonstrated by their highly refractive properties, and by the action of ether upon them, when they have escaped from the sarcolemma. All parts of the heart's muscular fibre are liable to this change, but not equally so. Thus it is most frequently found in the left ventricle, next in the right ventricle, then in the right auricle, and least frequently in the left auricle. It is generally more evident in the columnæ carneæ, and inner layers of the muscular fibres than elsewhere. As already stated, the heart may be affected throughout, or the change may be limited to a portion of either side. Of twenty-two cases in this series, in which the seat of the disease is expressed, in ten both ventricles were affected, in eight cases the left, and in four the right.

General appearance of a heart affected by fatty degeneration.

When we recollect, that the firm, highly organized muscular tissue, is nearly replaced by a fluid or semi-fluid substance possessing the characters of oil or soft fat, we can readily form a correct idea of the nature of the appearances which the examination of the heart itself will present. (See Plate VI.) Thus we invariably find a change in the colour and consistence of the organ. The colour is pale, sometimes being as pale as the "palest dead leaf;" more generally it is of a yellowish brown, a buff, or muddy pink colour. This appearance is not uniform. It is generally in spots or patches, and though the whole heart may be pale, the spots being still more so, when seen beneath the endocardium, give the tissue a mottled or spotted appearance. The spots are of infinite variety of size and form, such as lines, crescents, circles, &c. They may also be seen beneath the pericardium, and in the substance of the heart. As the disease advances, the spots

run together and give portions of the heart an uniform buff coloured appearance. This appearance may be confined to a portion of the heart, the rest presenting the ordinary healthy characters. The consistence varies also. It may amount to a mere softness or flabbiness, or be such as to permit the heart to be torn like "wet brown paper." The organ then feels like a piece of wet chamois leather, or "a wet glove." In some cases the heart thus affected retains, in appearance, much of its ordinary solidity, but the tissue breaks down by pressure exactly as would a lung consolidated by pneumonia. This state more frequently occurs in hypertrophied hearts. These differences in the amount of change in the colour and consistence appear to be connected with the causes on which the diseased condition depends, when this can be referred to a local modification of nutrition—such as obstruction of the coronary arteries—a small portion only of the heart may be affected but in the highest degree. It is then that the fatty degeneration occurs to a limited extent, but in its most marked form. Such is the condition which appears to have been noticed by Laennec particularly. When, however, the origin of the disease can be referred to a more extended lesion of the nutritive function, a greater extent of the heart may become diseased, but in a less degree. In the one case we have complete and extreme fatty degeneration, in the other merely the pale soft flabby heart, which has been described as granular degeneration of the organ. Thus, then, we have two forms of degeneration of the muscular fibre fundamentally the same, and differing merely in extent and degree. Between these two forms I make no essential distinctions, save those of extent and degree. In addition to the changes of colour and consistence, we also may remark other appearances in connection with this morbid process. The fibrous character of the heart's structure even to the naked eye disappears, and in some cases the tissue resembles that of a fatty or boiled liver. In other cases, the cut or torn surface has a granular aspect not unlike that of the surface of the lung in an early stage of grey hepatization. These different appearances may be in some measure due to the greater or less

fluidity of the oily matter present, as well as to the extent and degree to which the disease has advanced. In one case which came under my notice during frosty weather, the torn surface of the fibres presented the granular glistening character of the fractured ends of a piece of steel. Varieties also in appearance are caused by the presence of a greater or less quantity of blood or its colouring matter in the heart's texture or in its cavities, by which the lining membrane may, in the latter case, be dyed of a deep purple colour. These lesser modifications do not, however, interfere with the leading characters of the disease, which are paleness, softness, peculiar mottling, and friability of the heart's texture, changes which, with the altered character of the fibres as shown by the microscope, will leave no doubt, when present, of the existence of this morbid change. These alterations must, however, in some cases be looked for with care. In those cases in which the disease is much advanced, the quantity of fat present is so considerable, that the greasy appearance is at once evident to the naked eye. The scalpel used in cutting the tissue is greased, and so is blotting paper when applied to the cut surface. In other cases, however, in which the disease is far more extended, perhaps, but less advanced, these ordinary characters of the presence of fat may be so obscure, that they may escape notice in a superficial examination, and it is this fact which has caused the disease to be overlooked in the absence of those more efficient means which are now used for ascertaining the presence of these minute changes in structure. When possible, these means (I allude to the microscope) should always be applied to the investigation of this disease. The specimens should be examined in as nearly a recent state as they can be obtained; and different portions of the heart, if soft and easily broken, or paler than natural, should be examined without reference to the existence or non-existence of spots or mottling. The pale soft flabby hearts, which have been described by many writers, are without doubt examples of this degeneration.[1] In all

[1] The nature of this softened state of the heart has been a source of considerable difference of opinion amongst pathologists. Kreysig, and M. Bouillaud (Malad. du Cœur, tom. ii, p. 292) connect this condition

their characters, they resemble those in which the disease has been traced with the microscope. With the view of comparing the two classes of cases, I have placed all the latter cases in a separate series. Thus we shall have of fatty degeneration, fully recognised, thirty-three cases. Of flabby soft hearts, thirty-five cases; and of fat heart, fifteen cases; in all, eighty-three cases.

I am not aware that any chemical analysis has been made of any of these degenerated hearts. It is not very necessary. The action of æther, and the refractive properties of the granules, readily testify to their nature. Moreover, the extent to which the heart is affected with the disease, rather than the degree thereof, is the measure of its effects: hence chemical analysis could give but little additional information on the subject, beyond that above stated.

with carditis, and describe a red, a pale, and a yellow softening. Hope (Diseases of the Heart, 4th edit., p. 310) follows M. Bouillaud, but thinks the pale and yellow varieties may sometimes occur in the absence of inflammation. Laennec (Diseases of the Chest, &c., p. 565) describes this state of heart well. He says, the pale softening resembles in all respects the fatty degeneration which he also describes, save in not greasing paper. He denies the connection between this softening (in the absence of endo- or pericarditis) and inflammation, and attributes its origin to cachexia of the system. Akenside (Philosophical Transactions, vol. liii, p. 353) gives the history of a remarkable case, which he calls "gelatiniform softening." It occurred, as fatty degeneration frequently does, in a heart which had been the seat of former pericarditis. The subject was aged 14 years. Yet M. Chomel (Dict. de Méd., 2d edit., art. Ramolissement du Cœur), rendering the matter more confused, states this softening, in a youth of 14, to be the same thing as that described by M. Blaud (Bibliothêque Med., t. lxviii, p. 364) as "senile softening" of the heart. One cannot read the details of the cases given by these different writers without feeling convinced that, in the majority of cases, they are describing the same thing, and that this is fatty degeneration. Every sound pathologist knows that true carditis, by itself, is excessively rare (Meckel. Hist. de l'Academie, vol. xii, p. 33; and Baillie, Morbid Anatomy, 3d edit., p. 19), if it ever occurs. In low forms of fever the heart is softened, the cohesive power of its molecular elements is diminished; the markings on its fibres are faint; and the tissue is easily crushed. It seems to me, highly probable, that all these varieties of softening, except that just mentioned, are more or less intimately connected with this fatty change in the fibre. M. Blaud, indeed, offers no other

II.—OF PRECEDING OBSERVATIONS ON THESE DISEASES.

1. *Fatty growth on the heart.*—The older writers appear to have recognised many of the effects which have since been found connected with this condition of the heart. For example: Hippocrates,[1] in one of his Aphorisms, quaintly says, "Those who are naturally very fat are apt to die earlier than those who are slender." Celsus[2] pointedly refers to the difficulty of breathing and sudden death to which such individuals are liable.

These effects appear, however, not to have been traced to the state of the heart in particular, a diminished capacity of the vessels for the reception of the *pneuma*, or vital spirit, being the explanation given by Galen[3] and subsequent writers. The discovery of the circulation of the blood, and the evident

objection to such an idea in reference to his cases, than that fat is not seen overloading the fibres. Even M. Cruveilhier (Anat. Pathol., tom. i, liv. iii) is astray here. In describing "apoplexy of the heart," he notices the fragility and discoloration of the fibres; and two of his colleagues, in whom he placed much confidence, express their belief, that the cause of this state of things is fatty degeneration. Still this eminent pathologist does not agree with them, simply because he does not believe "that fat causes fragility of the heart." This latter opinion must now be entirely rejected. Moreover, Mr. R. W. Smith (Dublin Journal of Med. Science, vol. ix, 1838) compares his own specimens of fatty degeneration to this illustration of M. Cruveilhier, which is, in truth, a good representation of the disease. Thus we have sufficient evidence to show, that very erroneous ideas have existed as to the nature of this softened state of heart, and that our present view of it is likely to prove the correct one. It is curious to observe that Corvisart (Compend. de Méd. Pratiq., tom. ii, p. 370), who states that he had never seen a case of fatty degeneration of the heart, in describing pale softening, suggests that this probably has been on a superficial examination confounded with fatty degeneration, the general appearance of which it resembles. The use of the microscope has now reversed Corvisart's idea; for in all the flabby hearts which I have thus examined, fatty degeneration has been found.

[1] Genuine Works of Hippocrates. By Francis Adams, LL.D., Surgeon. Sydenham Soc.'s edit., vol. ii, p. 713.

[2] De Re Medica, lib. ii, s. 1.

[3] See the Commentary of Dr. Adams: The Genuine Works, &c.; and Methodus Medendi, lib. xiv, c. 15.

for the free and unembarrassed action of the heart, u attention to the state of this organ in these and r cases. Harvey[1] himself, in recording the appearances in the body of Parr, describes the heart as being much by fat. He did not, however, as incorrectly quoted fer,[2] attribute the old man's death to this cause. y all the systematic writers on the morbid anatomy of rt, from the age of Harvey to the present time, cases and i ences illustrative of the effects of the accumulation of fat on the heart will be found. Amongst these writers may be named Bonetus,[3] Lancisi,[4] Senac,[5] Morgagni,[6] Lieutaud,[7] Fothergill,[8] Portal,[9] Parry,[10] and nearly all those who have written on the heart since the commencement of the present century. Illustrative examples, recorded by some of these writers, will be found in the Third Series of Collected Cases which accompany this communication. The fat accumulated on the heart is supposed to act mechanically, and by its ssure on the muscular fibres, on the nerves, and on the vessels, to impede its function, embarrass its nutrition, produce those effects which we shall subsequently have occasion to describe.

2. *Fatty degeneration of the heart.*—The knowledge which we possess of the nature of this important disease is of a comparatively recent date. Lancisi, whose writings on the heart, and on various subjects connected with hygiene and pathology, are deserving of more attention than they receive, evidently recognised and described this condition, when he said of fat particles, "sub formâ cinerearum macularum

[1] The Works of William Harvey, M.D. By R. Willis, M.D.; Sydenham Soc.'s edit., p. 590.

[2] Nova Acta Acad. Nat. Curios., 1761, tom. ii, p. 107.

[3] Sepulchretum; Lugd., 1700, lib. ii, § xi, Obs. 16, 17.

[4] De Subit. Mortibus, Romæ, 1707, p. 176.

[5] Traité de la Structure, &c., 1774, vol. i, c. iv.

[6] De Sedibus et Causis, &c., 1765, Epis. 3, 27, 35.

[7] Hist. Anat. Med., 1767, vol. ii, p. 19.

[8] Medical Observations and Inquiries; London, 1776, vol. v.

[9] Mémoires de l'Académie des Sciences; Paris, 1784.

[10] On Syncope Anginosa, 1799, p. 7, &c.

sparsim internas tunicas variegant."[1] The "ash-coloured spots," which are now described as characterising the disease, had evidently attracted his attention. Lancisi, however, did not look on this condition as essentially morbid. Morgagni[2] more nearly approaches a correct estimate of its pathological effects, when, in describing the fatty condition of the heart in an aged female who had died from rupture of the organ, he asks, "Does the fat . . . . . preserve the fibres in the vessels, and their contexture very lax, and make them give less resistance to the distraction from each other, if any considerable distension be brought on?" To our own countrymen belongs the credit of having first directed attention to the nature of the disease. Dr. Andrew Duncan, jun., in an interesting communication on certain Diseases of the Heart, published in the 'Edinburgh Medical and Surgical Journal' in 1816, asks, "why the muscles of the heart should not become the seat of fatty degeneration as muscles in other parts of the body?" and then describes the appearance of a heart which he believed to be in this state. Dr. Cheyne,[3] of Dublin, soon after recorded, in the 'Dublin Hospital Reports,' a similar case, and referred to the "only observation" previously published, that of Dr. Duncan. Several cases were subsequently contributed to the same journal by Mr. Adams.[4] The specimens taken from these cases I had recently an opportunity of examining, through the courtesy of Mr. Adams. The subject seems to have been felt as one of peculiar interest by the Dublin School, and many illustrations have been furnished by the researches of Dr. Townsend,[5] Mr. Smith,[6] Dr. Stokes,[7] and more recently by those of Dr. Bellingham[8] and Dr. H. Kennedy.[9] On the Continent we

[1] De Motu Cordis; Romæ, 1728, p. 55.
[2] De Sedibus et Causis, &c., Epistola 27, Obs. 2.
[3] Vol. ii, 1818.
[4] Vol. iv, 1827.
[5] Dublin Journal, 1832, vol. i, p. 165.
[6] Ibid., 1838, vol. ix.
[7] Ibid., 1846, vol. i, N. S., p. 491.
[8] Dublin Medical Press, vol. xxi, 1849.
[9] Ibid., vol. xxii, 1849.

find Corvisart[1] stating, probably a little before the period at which Dr. Duncan's observation was published, that he had not himself seen what was called fatty degeneration of the heart; but as he had heard of other observers having done so, some of the cases would probably soon be published.

Laennec,[2] in his work on the 'Diseases of the Chest,' devotes a chapter to "fatty diseases of the heart." In it he describes the accumulation of fat on the heart and amongst its fibres. In these cases, the fibres, he says, "may become atrophied and replaced by fat, so that the columnæ carneæ seem held together by the lining membrane only." Still this, he adds, "is not the condition which I wish to denote by the name of '*Fatty degeneration of the heart.*'" "This is an actual transformation of the muscular substance into a substance possessing all the chemical and physical properties of fat." The natural red colour of the heart is then replaced by a pale yellow, like that of a dead leaf; the tissue is soft and greases paper." Laennec here evidently refers to the true degeneration of the fibre, though he does not attempt to show the nature of the change, beyond comparing it "to the fatty degeneration of the voluntary muscles described by Haller and Vicq D'Azyr."[3] In fact, as fatty degeneration

[1] Maladies du Cœur, Paris; and A Treatise on Diseases of the Heart, &c. Translated by Hebb. London, 1812, p. 166.

[2] On Diseases of the Chest, 4th edit., p. 583. Translated by Dr. Forbes.

[3] Fatty degeneration of voluntary muscles has long attracted the attention of anatomists, and its characters in connection with those of the disease in question here claim our notice. This change is observed in the muscles of the aged, in unused and paralysed muscles; it seems to occur also occasionally spontaneously, or without an evident cause, in the muscles of both man and the lower animals. Vicq D'Azyr (Œuvres, par Moreau, tom. v, p. 365) has given in detail the results of an examination made of a paralysed lower extremity, and he refers to the observations of Aristotle, Albinus, Leeuwenhoek, Haller, and Thual on the subject. He found the fat cells situated not between the lamina (*les lames*), but in the elements of the fibre; the fibres themselves being replaced by others thinner, finer, and more analogous to ligamentous tissue. I have examined this so-called fatty degeneration of voluntary muscles in four cases:

1st. The fatty muscle of over-fed prize cattle,—that which Vicq

of the liver was long recognised before the actual changes in the tissue were described by Mr. Bowman,[1] so this fatty degeneration of the heart had been recognised by Laennec

D'Azyr states that Aristotle described in the 'Historia Animalium.' "*Vertitur*," he says, "*in pingue quoties pabuli copia suppetit.*" The muscular fibres were present in this instance nearly unchanged, but everywhere covered with fat cells, which lay in rows upon the fibre.

2d. The muscles of a paralysed youth, whose case is described by Mr. Partridge (Med. Gazette, Nov. 1847, p. 944). Drawings, illustrative of the appearances shown in this case, are presented. The fibres are shown in one (Plate IV, fig. 3) overwhelmed with fat; in the other (Idem, fig. 4) the fibres remain apparently very little altered, the fat having been removed by ether.

3d. The lumbar muscles of a paralysed sheep.—The preparation had long been kept in a closed bottle. (See some Account of an uncommon Appearance in the Flesh of a Sheep. By Dr. Vaughan. London, 1813.) The soft waxy substance was composed chiefly of fat cells, of obscure granular fibres, and of other fibres composed of delicate filamentous, but strong tissue; and, lastly, where the disease had least advanced, the muscular fibres remained.

4th. The intercostal muscles taken from between the ribs of a man.—The ribs had, for a long time, been rendered fixed by an accidental injury. I found the fat cells very abundant, and the striated muscles in many points. In other parts, the fine filamentous tissue seemed to have replaced the muscular fibres. There were also some granular fibres.

From these observations I am disposed to think, that the tendency of voluntary muscles is to degenerate into a fibrous tissue mixed with fat, rather than into granular fatty matter. This observation applies to paralysed muscles; it is not improbable, that in the flabby muscles of those suffering from scurvy and other diseases of mal-nutrition, a change similar to fatty degeneration of the heart may be found. We have, however, in the heart itself a change analogous to the fibrous degeneration just described. The tissue, then, is of a fawn colour, has a firm leathery feel, and in it we find fibrous tissue, fat cells, and muscular fibres. Dr. Williams has described this fibrous degeneration. M. Rokitansky has also described this change, but he regards the fibrous tissue as unstriated muscular fibre which has been developed amongst the ordinary fibres of the heart. For further information on the fatty degeneration of voluntary muscles, consult Beclard (Anat. Générale, § 168), Mr. Paget's Lectures (Med. Gazette, vol. ii, 1847), and Mr. Hallett (Edinb. Med. and Surg. Journal, 1846, vol. ii, p. 6); also (Idem, 1849, vol. i, p. 269).

[1] Lancet, vol. i, 1842.

and the writers above named, before its true character was ascertained. Laennec, however, was wrong in saying that the disease proceeded from without inwards, and also that it was confined to the apex of the heart.

MM. Bouillaud,[1] Andral,[2] Grisolle,[3] and other French writers, seem to have adopted the views of Laennec, and to have compared this change, without inquiry, to the fatty degeneration of the voluntary muscles. The increasing accuracy required in pathological investigations, and the improved appliances for conducting them, soon rendered this ambiguous term of comparison unsatisfactory. Hence the seat of the fatty matter, and its relation to the tissue in which it was found, were examined. Dr. Williams,[4] whose name I cannot mention here without a respectful tribute of thankfulness, for the valuable assistance and advice which he has given me during the progress of this inquiry, as on many other occasions, states in his work on 'Diseases of the Chest,' published in 1840, that in true "sebaceous degeneration, the fatty matter is deposited in, and not on, the muscle of the organ, which thereby becomes changed in nature, and impaired in functions." Thus is marked the first step in this inquiry. In the same year, some cases fell under the notice of Dr. Peacock, with the notes of which he has kindly favoured me, and which were subsequently published in the 'Monthly Journal of Medical Science,' for 1844. In these cases Dr. Peacock describes the tissue of the heart as being pale, soft, mottled, and greasy, resembling fatty liver. The change he describes as being most evident in the interior of the heart,[5] the organ being destitute of fat on the surface. The microscopic examination of the tissue, showed the fibres almost or entirely

[1] Malad. du Cœur, vol. ii, p. 294.

[2] Anatomie Pathologique, 1820, tom. ii, p. 318.

[3] Traité de Pathologie Interne, vol. ii, p. 387.

[4] The Pathology and Diagnosis of the Diseases of the Chest; London, 1840, p. 279.

[5] The presence of fat in the internal portions of the heart's texture has been described by Dr. Elliotson, (Lect. on Med., London, 1839, p. 36; and Diseases of the Heart, p. 32.)

deprived of their transverse striæ, and covered with small oil globules. M. Rokitansky's[1] more extended investigations have added greatly to our knowledge on the subject. He describes three forms of fatty disease: 1st, excessive accumulation on the surface; 2d, intrusion of fat amongst the fibres, constituting what he calls fatty metamorphosis; and 3d, degeneration of the fibre, which presents varieties, according to the extent, seat, and degree of the evil. M. Rokitansky, however, left much to be added, and something to be corrected. To Mr. Paget[2] the English Pathological School is indebted, for his introduction to it of the views of the last-named writer, but still more for his own more accurate and more extended investigation into the nature and anatomical characters of this morbid process; to which he has added some illustrations of one of the most striking of its effects, viz., sudden death. Dr. Ormerod[3] has recently followed the footsteps of his learned colleague, and greatly enhanced our knowledge of the subject, by a series of cases exhibiting the variety of circumstances under which this disease may occur. In addition to the preceding, individual cases of considerable interest have been recorded by Mr. Mead,[4] Dr. Hughes Bennett,[5] Dr. Latham,[6] Dr. Crisp,[7] Mr. Stallard,[8] Mr. Corfe,[9] and other observers, abstracts of whose cases will be found in the annexed table.

Lastly, this disease has been observed amongst lower animals. Mr. Kent[10] has given a description of a rupture of the heart in a mare. The right ventricle and the auricle had undergone fatty degenerations, and old adhesions of the

[1] Handbuch der Pathologischen Anatomie. Von Carl Rokitansky. Wien, 1842. Band iii, p. 462.

[2] Medical Gazette, vol. ii, 1847, Lecture vi.

[3] Ibid., vol. ii, 1849.

[4] Ibid., 1846.

[5] Edinb. Monthly Journal.

[6] Clinical Medicine; London, 1846, vol. ii, p. 169.

[7] Trans., Path. Soc. of London, vol. i.

[8] Transactions of the Provincial Assoc., 1847, vol. iii, N. S., p. 105.

[9] Medical Times, vol. i, 1848-49, p. 142.

[10] Lancet, vol. i, 1847, p. 125; and Veterinary Record.

pericardium existed. During life, the animal had exhibited several of the symptoms which characterise the disease in man. I have also received the histories of two very similar cases: one, that of a fat ox; the other, of a London dairy-cow; but it is not necessary to detail them now.

III.—A CONSIDERATION OF THE CIRCUMSTANCES UNDER WHICH FATTY DISEASES OF THE HEART OCCUR,—THEIR CAUSES.

1. *Fatty growth on the Heart.*—In every inquiry of this kind we are met by the unsolved problem, Why are certain individuals and certain parts of the body more prone to the formation of fat than others? We can ascertain, with some degree of certainty, the circumstances which will promote the formation of fat in general;[1] and, as the facts shown in the Table tell us, that when fat forms throughout the system, the heart will partake largely of the accumulation, we must, therefore, at present content ourselves by recollecting what the nature of these influences of extended operation is. Thus, in the first instance, we know that the material of the fatty tissue must be derived, directly or indirectly, from the blood,[2]

[1] See Obesity, by Dr. Williams (Cyclopædia of Practical Medicine; London, 1833); and Adipose Tissue, by Dr. Craigie (Cyclopædia of Anat. and Physiol.; London, 1836). And since this essay was presented, Lectures on Obesity, by Dr. T. K. Chambers (Lancet, vol. i, 1850).

[2] All *healthy blood contains fat*, as shown by the researches of Chevreul, Lecanu, Boudét, Trail, Christison, Babington, Davy, Simon, and others. It is found in the serum, in the fibrin, and in the globules. (See Cyclopædia of Anatomy, as quoted above, pp. 59-60: Simon's Chemistry, Sydenham Soc.'s edit., by Dr. Day, 1845, vol. i, pp. 163, 177, 188, 195.) This fat is in a diffused or saponified form, and does not admit of recognition by mere examination, as in the case of milky-looking blood. It is said, however, that in some of these cases of "fatty degeneration" the fat is so abundant in the blood, as to be seen floating in it like oil. Such is Mr. R. W. Smith's description, (Dublin Journal, vol. ix.) Dr. Stokes (Idem, vol. i, N. S.) seems to confirm the observation. Haller (Elementa Physiol.) refers to Malpighi, Glisson, and Ruysch as having observed free oil globules in the blood. Dr. Gale (Payne's Letters on the Cholera, p. 151) describes a similar appearance in the blood of persons dead of this disease. In making these observations, care must always be taken, that the oil flowing from the divided tissue and mixing with the blood, does not become a source of error.

and that the quantity of the one must bear a relation to the supply of material from the other.

Secondly, we know that the quantity of fatty matter in the blood is in direct relation with that supplied by the food on the one hand,[1] and on the other with the greater or less freedom which exists for the free elimination of its elements in the respiratory process.[2] We, therefore, feel, that if the food is deficient in the materials which readily constitute fat, and the respiratory process is accelerated and increased by abundant exercise, little fat can be formed. Equally true is the converse, that those who fare luxuriously and lead sedentary lives will grow fat. In the one case, neither the body nor the heart will suffer; in the other, in the general accumulation, the heart will certainly participate. Beyond these general principles I fear we cannot go, and even to these there are exceptions.

Thus the Table, Series III, shows, that of fifteen cases of extreme fatty growth on the heart, eleven occurred in very fat individuals, and only one in a person who is described as being thin. M. Bizot found nine fat hearts in fourteen fat females; but he also found fourteen fat hearts in twenty-nine thin females. In males, the numbers were still fewer. Such cases are illustrations of the exceptions referred to; and further illustrations, though they are somewhat more apparent than real, are found in cases of phthisis. To these it is not possible to refer now. We observe, that age marks a decided influence over the formation of fat on the heart. It is very scanty in infancy, and is rarely present in any quantity

[1] For observations and experiments on the presence of *fat in the blood derived from the food*, see Notes to Hewson's works by Mr. Gulliver, Sydenham Soc.'s edit., 1846, p. 35; also Simon's Chemistry, vol. i, pp. 192 and 202 (in blood of vena portæ); and also more recent experiments by M. Millon (Med. Gazette, vol i, 1850, p. 127).

[2] For information on the circumstances which influence *the elimination of carbon* in the process of respiration, see Simon's Chemistry, vol. i, p. 128; also on the elimination of fatty matter by the lungs, see Comptes Rendus (Juil. 1847), which contain some curious results, as to the quantity of fatty matter obtained from the lungs according as the respiratory process is more or less free.

before the 30th year.[1] Thus of the fifteen cases comprised in this series, thirteen were above fifty years of age, and one only under that age. Males, too, according to this collection of cases, are more liable to this excessive accumulation of fat than females, the numbers being as twelve to three. M. Bizot's observations as to sex are different from mine. He finds that females are more liable to have a large amount of fat on the heart than males; still, as his observations do not apply to this extreme condition, but to a mere greater or less quantity of fat, they can scarcely be said to be contradictory of those now enumerated.

2. *Fatty degeneration of the Fibre itself.*—In the following observations I seek to establish the fact, that the molecular fatty matter in the fibre is the result of a chemical or physical change in the composition of the muscular tissue itself, independent of those processes which we call vital.

Anatomists are well acquainted with the substance named adipocere, and with the facility with which it frequently forms in dead animal tissues excluded from the air and exposed to moisture.[2] Much difference of opinion has existed amongst chemists as to the origin of this substance. All admit the great quantity of fatty matter in its composition. One class, however, which includes Gay-Lussac, and Berzelius, believes that "the compound results entirely from the fat originally present in the substance, and that the fibrin is completely destroyed by putrefaction."[3] The other class, which includes

[1] Corvisart (Maladies du Cœur) quotes from Kercking the case of a child whose heart seemed wanting, so great was the quantity of fat in which it was imbedded.

[2] Haller (Elemen. Physiol., p. 29) mentions the names of Ruysch, Beecher, Bruckman, and others, as familiar with this substance. Mr. G. S. Gibbes, in a communication addressed to the Royal Society (Philos. Trans., 1794-95), directed attention to the formation of adipocere, and adds that Sir Thomas Brown, in his 'Hydriotaphia,' had described it, and also Lord Bacon in the 'Sylva Sylvarum.'

[3] See Adipocere, by Mr. Brande, 'Cyclop. Anat. and Physiol.,' vol. i, p. 56.

Dr. Thomas Thomson[1] and Mr. Brande, believes "that the fatty matter is an actual product of the decay, and not merely an educt or residue." The correctness of the latter opinion is shown by the following observations: A piece of this substance, obtained from the muscular part of the thigh of a horse, (portions of the specimen are in the British Museum and in that of the Royal College of Surgeons,) was submitted to examination. In its general appearance it resembles spermaceti. It is rather darker coloured and more fragile. Its surface is marked by irregular outlines of a red colour, evidently the boundaries of the fasciculi of the muscular fibres; it emits a strong ammoniacal odour, floats on water, and is nearly all dissolved in ether. The ether, when allowed to evaporate, leaves a large quantity of granular and fatty matter.

The trifling undissolved residue presents, when floating in water, a delicate flocculent appearance. Examined with the microscope, the flocculent matter is found composed of delicate filaments forming a cellular web. In some parts the filaments presented something of a longitudinal arrangement, in others the web appeared perforated by regular foramina.

A microscopic section of the adipocere itself, unacted on by any agent, (the section being made with a knife slightly warmed, required by the fragility of the substance,) showed the following appearances:—1st. Bands running longitudinally, as in the arrangement of the muscular fibres, (see Plate V, fig. 2.) These bands are dark coloured and opaque, except at the broken edges or extremities; at these points they are seen to be composed of small crystalline scales. The wavy outlines of the blood-vessels or nerves are sometimes seen between the fibres or fasciculi. In the intervals may be observed flat discs composed of radiating acicular crystals. These appearances vanished on putting ether on the specimen, and the merest particle of the filamentous substance remained.

[1] Annals of Philosophy, vol. ii, 1818. "The quantity of fatty matter, in this instance, was by far too great to suppose it to have pre-existed in the living body."

From these observations I conclude, that whatever be the nature of the process, the places of the muscular fibres, the blood-vessels and nerves are occupied by fatty matter, which could not have existed in them during life. This opinion is confirmed by experiments on what may be called the artificial formation of adipocere. Mr. Gibbes, whose communications to the Royal Society have been just mentioned (note, page 140), states that Lord Bacon had indicated the mode of converting the waste flesh of animals into fat, which might be used for various domestic purposes. Mr. Gibbes, acting on this idea, succeeded by different processes, including exposure to running water, to nitrous acid, &c., in converting large quantities of animal flesh, even the carcase of a whole cow, into fatty matter. The difficulty which the experimenter met with in freeing this substance from colour and smell, or his death, appears to have prevented the communication of his further proceedings, which he had promised to the Society, and neither his nor Lord Bacon's discoveries have been made useful in supplying fat from waste flesh. To the pathologist they afford information of peculiar interest in connection with the following experiments:—A little more than two years ago I obtained, for the purpose of examining the healthy structure of the tissue, the healthy heart of a healthy child who had died a few hours previously from the shock of a severe burn. Having satisfied myself on the required point, I placed the specimen in weak spirit and water (one part to eight or nine), for the purpose of future examination. On looking at the specimen after a few weeks, I found it greatly changed; it had a confused granular aspect, to such an extent, indeed, as to lead me to feel, that there must be some error in previous observations on the specimens of true degeneration, as portions of a healthy heart now exhibited characters so similar. I found, however, that this change existed in all parts of a heart, which I had no doubt had been healthy, in some parts at least, when previously examined. I mentioned the observation to Dr. Williams, and was gratified at hearing from him, that the fact of this change was an illustration of an experiment which he had suggested to his clinical assistant, Mr. Edward

Palmer, some time previously, viz., to try whether fatty matter was not formed after death by a molecular change in animal tissues kept excluded from the air but exposed to moisture.[1] He suggested further observations of this specimen, and some further experiments. These have been made, and the result has been, that the heart first described presents the most marked and universal character of true fatty degeneration. It is of a pale cream colour, it is soft, portions of it float in water, and when examined with the microscope exhibit the most advanced state of degeneration, differing from that which occurs during life in this respect alone,—that it is universal. Every fibre is fatty, whilst in that degeneration, which occurs during life; many fibres retain their healthy organization.

A specimen of a sound sheep's heart, placed in very diluted nitric acid,[2] has been traced through a series of similar changes; but as a shorter interval has elapsed, it has reached a less advanced stage. The specimens have been examined by Dr. Williams, Mr. Quekett, and Mr. Toynbee,[3] and others. Illustrations of the appearances presented will be found in Plate V, fig. 1. The blood-vessels and nerves participate in this change. It does not appear necessary to illustrate further the conversion of these tissues after death, external to the body, into fatty matter,[4]—we shall therefore turn to

[1] The same idea has been entertained and clearly expressed by Dr. Hodgkin, in the Seventh Report of the British Association, and will also be found in his 'Lectures on the Morbid Anatomy of the Serous and Mucous Membranes,' vol. ii, part i, 1840, p. 539. The fact of finding a fatty liver in a preparation which did not seem to be such when taken from the body, contributed to the formation of this view.

[2] Mr. Brande (loc. cit.) states, that "the action of very diluted nitric acid on some modifications of albumen, is also attended by their conversion into an adipocerous substance."

[3] Mr. Paget also kindly examined these specimens shortly before this communication was read.

[4] Mr. Gulliver (loc. cit.) mentions examples of the apparent conversion of albuminous matter into oil, as being noticed by Sir H. Davy, Dr. Davy, and himself. Wurtz has formed butyric acid from the decomposition of fibrin (Simon's Chemistry, vol. i, p. 79); and it is stated in Dr. Garrod's Lectures in the 'Lancet,' that Guckelberger has found the protein textures capable of affording, by their decomposition, a variety of compounds similar to those which belong to the amylaceous series.

inquire whether like changes do not occur within the body and before death. Dr. Babington[1] has apparently observed the formation of fatty matter in the blood at the expense of the albumen. Dr. Williams, in the first edition of his 'Principles of Medicine,'[2] recognises the presence "of fat in softened tubercle, pus, atheroma, and gangrene of the lungs, as being derived from the debris of animal matter, as in the conversion of flesh into adipocerous matter." In a subsequent edition of the same valuable work[3] further illustrations of this process, and of the circumstances under which it occurs, are clearly given. M. Rokitansky[4] mentions several instances in which fat may be found (as in masses of fibrin, in non vascular tumours, in the walls of arteries, &c.), in situations in which its presence could not be deemed the result of a deposition from the blood. Mr. Paget[5] mentions a striking example of this change observed by him in some masses of what had been medullary cancer of the liver, "certain parts of which, when examined, were found to consist almost entirely of oil globules." I have seen the same appearance in the central softened portion of a large mass of tubercle from the kidney, the fatty globules being there infinitely more numerous than in those parts where the softening had not commenced. Dr. Copland has recently communicated to me the particulars of a case of chronic inflammation of the membranes, covering the spinal cord, which caused paraplegia. The patient finally died from the paralysis extending to the muscles of respiration. After death, the recent effusion of plastic matter which existed on the upper part of the cord was found to pass inferiorly where the inflammation had first commenced and ceased, into a soft fatty matter. The same learned authority mentioned to me at the same time another case, in which the central portions of some large bands of adhesions, found in a case of chronic peritonitis, consisted of

[1] Cyclopædia of Anatomy and Physiology, vol. i, 1836, p. 423.

[2] London, 1843, p. 321.

[3] Second edit., 1848, p. 371 et seq.

[4] Op. cit., band i, Wien, 1846; and British and Foreign Med.-Chirur. Review, vol. i, 1848, p. 169.

[5] Lectures, loc. cit., p. 149.

fat. I find a case recorded without particular reference to this point by Dr. Archibald Hall,[1] in which the fibrin of a hæmorrhagic effusion into the theca vertebralis consequent on a fall was found, after an illness of some months' duration, changed into fat.[2] The fatty matter here formed independently of a direct connection with the vascular system, is, at least in such of the cases as have been examined with the microscope, and they have all been but the two last-mentioned, found to be in all its characters analogous to the granular fatty matter observed not only in degenerated muscular fibre, but in various other organs which are the seat of fatty degeneration. Here, then, a most important question arises,—Is the fatty matter which is found in the degenerated muscle of the heart derived from a molecular change in the texture, or is the fat deposited from the blood? In answer to this question we refer to the preceding facts. We have seen the substances analogous to muscle in composition converted both in and out of the body into this same fatty matter. We have traced also the muscular fibre itself undergoing (external to the body, and thus beyond the reach of deposition or the influence of the nutritive process), a change perfectly identical with that which it undergoes in the living body. There is, therefore, a presumption in favour of the view which holds, that the processes in both cases are identical; that, in fact, when these protein compounds, albumen and fibrin, are effused in a form which is not readily susceptible of organization, when even they enter into the composition of tissues and textures, the organization of which is imperfect from inherent depravity, from natural decay, or from a deficient supply of those elements and influences, in the absence of which nutrition fails, that in these cases I say those substances degenerate and pass into fatty matter. In other words, that when the vital power which belongs to these higher pro-

[1] British American Journal of Medical Science, vol. iv, p. 61.

[2] Senac (Traité de la Structure, quoted in Dr. A. Duncan's Essay) describes a case from Weitbrecht, in which a substance resembling lard occupied the pericardium; the result, apparently, of this fatty change in effused fibrin.

ducts of animal organization is weakened or destroyed, they yield to the physical and chemical influences which surround them, and by an inherent principle descend into a class which is shared by them in common with plants and minerals.[1] It would be highly interesting to illustrate this argument by facts drawn from the multitude of instances in which different observers have recently found this fatty degeneration. Some of these facts no doubt readily suggest themselves, though perhaps less in the case of the heart than in other organs. It is this organ, however, which claims our attention here. An interesting observation made by Mr. Paget supplies a most important step in this inquiry. It is now pretty well established, that a cell germ, or nucleated cell, is an essential element in the nutritive process of all tissues. The first change that can be traced in the process of degeneration of the heart's fibres, and it requires care to observe it, is the destruction of these cell germs in the tissue. Mr. Paget[2] writes: "When the change is least marked, and but little fatty matter has collected within the sarcolemma, the outlines of the nuclei look dim, and they lose their colour. In the further advanced stage, the nucleus of the fibre cannot be seen at all; its former place is indicated, if at all, only by some out of the narrow column of yellow granules, and in a yet later stage, or when the sarcolemma appears nearly full of fatty particles, all trace of both the nucleus and these granules is lost."

Thus we have evidence, that the nutrition of the heart is impaired, and that those powers are weakened, by which it is enabled to resist the influences which tend to the disintegration of its tissue. A review of the circumstances under which this degeneration occurs, is further confirmatory of the view adopted here. These circumstances exhibit impairment of general and local nutrition.

1. *Fatty degeneration, dependent on general or con-*

[1] The origin of the valuable hydrocarburet—coal from vegetable matter suggests something very analogous, in the transformation which occurs, to the formation of adipocere from animal matter.

[2] Lectures, loc. cit., p. 145.

stitutional causes, is found in persons who have suffered from a variety of exhausting diseases. Amongst the cases recorded by Dr. Ormerod,[1] some striking illustrations of this will be found. Of twenty-five cases, three had suffered from hemorrhage, three from phthisis, one from delirium tremens, one from cancer, two from fever. These cases are taken chiefly from hospital practice, and illustrate better than the cases which I have collected, and which are derived from different sources, the relation of this disease to general impairment of nutrition; still amongst my cases will be found several similar to those now mentioned. Thus, one is that of a child, who, having been long in bad health, died of cancrum oris; another is that of a young woman, who had suffered from long-continued gastric irritation and chronic phthisis; a third from hæmaturia. Several other examples, in which the nutritive functions were equally impaired, will be found amongst the cases presented with this communication, and which it is unnecessary therefore to refer to here. But besides this class of cases, there is another, in which we find degenerations going on simultaneously in other organs, for example in the walls of arteries, in the liver, in the kidneys, &c., giving evidence, likewise, of an imperfect nutritive function, acting widely, and shared in by the heart.[2] Of this state, illustrations, which more careful observation might have rendered more numerous, will be found in the tables. This degeneration of arteries, which Mr. Gulliver has long since shown to be fatty, has already been recognised by Dr. Bellingham, as being frequently associated in the form of aneurism, with this analogous condition of the heart.[3] And it is of considerable interest in connection with the second condition, viz.:

2. *Fatty degeneration connected chiefly with a local modification of nutrition.* In thirteen of the thirty-three cases of degeneration of the heart (Series I) the coronary arteries

[1] Medical Gazette, vol. ii, 1849.

[2] The simultaneous existence of the *arcus senilis*, or fatty degeneration of the cornea, with this affection of the heart, will be subsequently referred to as an aid to the diagnosis of the latter.

[3] Dublin Medical Press, vol. xxi, 1849, p. 290.

were more or less ossified or obstructed, likewise in seven of the second series, and in five of the third.

In all the cases which I have myself examined on this point (except in a case of phthisis, and some cases allied with it), I have found more or less obstruction of these vessels. I have seen the coronary artery extremely ossified, going directly to the only part of the heart affected. (See Case 26, Series I.) A nearly similar condition will be found reported as having existed in several other cases in both series. At least, arteries proceeding to the principal seat of disease, are found more or less obstructed. (See Cases 9 and 26, Series I; and cases 2 and 3, Series II.) In the last case, the coronary artery was single and ossified. This connection between fatty softened heart and obstructed arteries suggests an analogy with softening of the brain, in which a like condition of the vessel is known to exist.[1]

Dr. Abercrombie[2] has, indeed, compared this cerebral softening to dry gangrene, and he was not wrong, when the difference in the relation of the parts to external influences is remembered.

There are two causes which contribute in a marked degree to the frequent association of diseased arteries with fatty degeneration of the heart:[3] one of these is, that the disease of the arteries is itself an evidence of the existence of a more or less impaired state of nutrition throughout the system. The other is a fact mentioned by Mr. Swan,[4] in a recent communication 'On the Blood-vessels of the Heart.' It is,

[1] Since the presentation of this communication to the Society, a highly interesting observation has been published by Mr. Paget, showing that fatty degeneration of the small cerebral arteries exists in many cases of cerebral apoplexy.

[2] Diseases of the Brain.—Edinb. 1828, pp. 25 and 269.

[3] M. Bizot finds ossification of the coronary arteries more frequently in males than females, and rarely before 40 years of age. These facts correspond as to the sex in, and age at, which fatty degeneration most frequently occurs. He likewise found the left coronary artery more frequently ossified than the right, as the left ventricle is also more frequently the seat of degeneration than the right.

[4] Medical Gazette, vol. xlii, p. 751.

that there is not a free communication between the coronary arteries; that one of them cannot be readily injected from the other, hence obstructions from any cause in one, will not admit of the deficiency being compensated for by the supply from the other. Another local modification of nutrition, caused by the previous occurrence of endo- or pericarditis, is found connected with fatty degeneration. Dr. Williams[1] has long since observed this association; he says: "a pallid yellowish appearance of the substance due to an altered state of nutrition, is not at all an uncommon accompaniment of other lesions of the heart, such as accumulation of fat and adhesion of the pericardium connected with partial obstruction of the coronary arteries."

M. Rokitansky goes so far on this point as to say, that this degeneration "most frequently occurs in hypertrophied hearts, in combination with the remains of endo- and pericarditis." And here it might be stated, that this author[2] believes the fatty degeneration to depend on an impairment of the nervous power of the heart. In hypertrophied hearts he says, "the balance is lost between the nervous powers and the volume of the muscles; therefore, in those parts where a paralysis, so to speak, exists, this change occurs, as in the muscles of animal life."

This eminent pathologist seems to have overlooked a fact, which will presently be further illustrated, that the disease occurs in hearts which are unchanged, or actually diminished, in size; and secondly, if his idea were correct, all hypertrophied muscles, in which a similar loss of balance occurs, must, on the same principle, suffer in the same way. It is well known that they do not do so.

Mr. Paget[3] pointedly describes the effects of inflammation in producing atrophy and degeneration, not only of the heart, but also of the kidneys, liver, &c.

The mode in which the inflammation acts in these cases

[1] The Pathology and Diagnosis of Diseases of the Chest, 1840, p. 245.
[2] Loc. cit., p. 463.
[3] Lectures, loc. cit., p. 148.

will be found also fully discussed by Dr. Williams[1] in his 'Principles of Medicine,' under the head "Degenerations."

Endo- or pericarditis had previously existed in six cases in Series I, and in eleven in Series II. Lastly, it appears, that in some cases dilatation of the right side of the heart, and congestion of the coronary veins, may promote degeneration of the fibres. Thus, then, we trace the diseased state of the heart's texture to a variety of causes, all of which appear to act in the same way; that is by interfering with the supply from the blood, either in quantity or quality of those elements, which are essential to the healthy nutrition of this organ, and which should, no doubt, be in relation to the high degree of organization and vitality which its peculiar functions require. These disturbing influences we trace in all those too-familiar agencies which produce impaired health, and premature decay, as likewise in the progress of life, from natural decay. A variety of circumstances connected with the origin and progress of this disease, including the diseased condition, with which it is observed to be connected, will be found in the Tables of Cases and the accompanying Abstract (pp. 166 and 193). To recapitulate these circumstances here would be tedious and unnecessary; it will suffice to say that, in reference to *sex*, the disease is more frequent in males than females, in the proportion of twenty-four to nine (in Dr. Ormerod's cases the proportions are similar, being fifteen to seven). In reference to *age*, one individual only is under 20 years of age, four are between 20 and 30, the same number between 30 and 40, and fifteen, or nearly half, are over 60. Twelve of thirty-three cases are described as having occurred in fat individuals, and nine in those who were thin. And here it would be well to remark, that the quantity of fat on the heart itself was more than usual in twenty-one cases of thirty-three, and less than usual in four, being nearly absent in three of these. In reference to the *class in society*, in which the disease occurred, nine of thirty-three belonged to the higher ranks, eight to the middle, and sixteen to the lower; whereas, in mere fatty growth

[1] Principles of Medicine, 2d edition.

on the heart, the proportions are reversed: seven of fifteen belonged to the first class, six to the second, and only two to the third. Fatty degeneration and fatty growths thus contrasted are seen, in a great degree, to arise from different causes, the one is the result of an accumulation in the blood of the elements of fat, the other is the result of decay and disintegration. Fatty growth may occur alone, so may fatty disintegration; but as both are the results of a degraded and bad nutrition, both may be often found in combination.

IV.—THE EFFECTS OF FATTY DISEASES ON THE STRUCTURE AND FUNCTIONS OF THE HEART.

1. *Of fatty growth.*—In a preceding part of this communication, the opinions which have been held as to the effects of fatty growth in excess on the heart, have been mentioned. These effects may be briefly enumerated, as being languid and feeble circulation,[1] a sense of uneasiness and oppression in the chest, embarrassment and distress in breathing, coma, syncope, angina pectoris, sudden death, rupture of the heart, &c. Thus amongst fifteen cases, difficulty of breathing was present in nine; syncope or faintness in eight; giddiness and coma in five; pain in the region of the heart existed in six; and in four of these, amounted to angina pectoris. Of the fifteen cases, fourteen died suddenly, of which ten may be said to have died by syncope, three by rupture of the heart, one by coma; one died by disease of other organs. This catalogue of evils, in a series of cases in which no other lesion of the heart's texture is stated to exist, not even softening, save simple accumulation of fat, would suffice to place this in a prominent position as the source of very

[1] The impaired contractile power of the heart, and the immediate source on which this depends, cannot be more clearly expressed than in the following words of Haller, when describing the condition of the voluntary muscles in a state of "fatty degeneration." He says, "Deinde inter fibras musculosas congestus eas a se invicem ita separat ut pene evanescant, et ex parallello situ divulsæ, inque nimis molli medio natantes vim suam contractilem desinant excercere." (Elem. Physiol., lib. i, § 4.)

serious results. But we are in this difficulty, that we are not quite sure that, in these cases, some unrecognised degeneration of the fibres did not co-exist. We shall now see, that in this latter condition, these effects occur in an equally striking degree; it will, therefore, be well, not to dwell too much on such effects, as proceeding from fatty growth alone.

2. *Fatty degeneration.*—The effects of fatty degeneration of the fibre on the structure and function of the heart might almost, *à priori*, be inferred, when it is recollected, that the firm contractile muscular flesh is more or less replaced by an inert fatty matter, and that this change represents, at the same time, impaired constitutional powers. All these effects may be comprised under these heads: *a*, Impairment of structure; *b*, Impairment of function. Many of these effects being capable of recognition during life, may be said to be symptomatic of the disease.[1]

A. *Effects on the structure of the heart.*—*a. The size.*—That hypertrophy of the heart and fatty degeneration are frequently associated, has been already mentioned. This condition is recorded as being present in twenty-three of thirty-three cases in Series I, and in sixteen of thirty-five in Series II. The size of the heart is stated to have been unchanged in eight cases of these two series, and to have been diminished below the natural standard in four. It is, therefore, perfectly clear, that fatty degeneration frequently occurs in hypertrophied hearts; not, I should say, as

[1] It should be stated, that many cases are recorded, in which patients have died, and in whose hearts this condition has been unexpectedly found. Some of these cases are said to have been previously in the enjoyment of perfect health, others have been ailing, but not in connection with the heart; others ailing likewise, and the heart being suspected has been examined, and failed to give evidence of the existence of the disease, which post-mortem examination has subsequently shown to be present. I have not met with such cases. On the contrary; even in some instances in which the individual dying suddenly was said to be in good health, I have found, on inquiry, that symptoms, more or less marked, had existed, and might have been previously recognised, if attention had been called to them.

M. Rokitansky supposed, from a disturbance in the balance of nervous power,[1] but from these enlarged hearts requiring a larger supply of the materials for nutrition, which we have already seen so materially interfered with, or from the elements of which these enlarged hearts are composed, being in themselves more susceptible of change. It may be worth suggesting, whether the hypertrophy may not, in some of these cases, be the result of a natural effort to compensate for loss of power. In one case (No. 4, Series I), the heart weighed twenty-two ounces, and there was no obstruction, nor other disease, save this degeneration, which could account for the hypertrophy. The heart is said to have been dilated in six cases of Series I, in three of these in association with hypertrophy. The heart retaining its size, or being less than natural, does not call for special remark.

b. The texture.—The softness and fragility of the heart's tissue have already been described. They are the source of some of the severest and most fatal lesions to which the organ is liable, viz. *rupture.* This lesion will be found recorded in eight cases of thirty-three in Series I, and in seventeen of thirty-five in Series II;[2] or in twenty-five cases in sixty-eight. The rupture was complete, that is to say, it perforated the walls of the heart, so as to permit hæmorrhage into the pericardium in all the cases except six. One of these cases was a rupture of the septum of the ventricles; in two, there existed ruptures within the substance of the wall of the left; in one, within that of the right ventricle; in one, there was a partial rupture of the internal fibres of the right auricle; and in another, a partial rupture of some

[1] The only case in which I have found disease of the heart stated to be connected with disease of the nerves, is a case of softened heart, mentioned by Joseph Frank (Praxeos. Med. Univ. Præcepta, vol. viii, part ii, § liv, p. 316; and Encyclographie des Sciences Méd., vol. viii, p. 188), in which the vagus nerves were diseased.

[2] This disproportion in these series is due to the fact, that the cases in Series I have been taken as they occurred; whilst those in Series II have generally been recorded in consequence of some peculiarity. Such, for example, as this very lesion.

fibres on the external surface of the heart. All these cases were fatal within a short period after the accident was supposed to have occurred. The narratives of the cases suggest many points of interest in connection with this lesion, which may, on a future occasion, occupy attention. It will suffice now to say, that from the time when Harvey adduced a case of rupture of the ventricle, and the effusion of blood into the pericardium, as proofs of his then much doubted theory, this accident has attracted the notice of many pathologists, and its cause has received a variety of explanations. The actual friability of the heart appears to be quite sufficient to account for the lesion in any case in which fatty degeneration can be found; and that degeneration, I find good reason for believing, exists in the greater number, if not all, the specimens in museums which I have examined, and likewise in very many of the recorded cases of this accident, besides those from which the preceding numbers are taken. Amongst the lesions resulting from a partial rupture, are some which claim separate mention. One of them is the appearance described by Cruveilhier,[1] as *cardiac apoplexy* (Case 2, Series II), and caused by hemorrhage into a portion of the heart's walls. One of the cases in the Table is a good illustration of this form of hemorrhage into the wall of the right ventricle, a situation in which M. Cruveilhier states it never occurs. (See Case 15, Series I.) An extremely interesting example of this disease has been recorded by Mr. Stallard,[2] (Case 14, Series I.) The case recorded by Mr. Stallard affords also an illustration of another appearance produced by this partial rupture and hemorrhage. It is when the accident has not been immediately fatal, the coagulum loses its colour, producing an appearance like an *encysted abscess* in the walls of the heart. These appearances have been fully noticed and described by Meriadec Laennec.[3] He refers to the "ingenious opinion," as he calls it, of M. Cruveilhier, that *consecutive false aneurism* of the heart may result, as no doubt it in some cases does, from

[1] Anat. Pathol., vol. ii, Maladies du Cœur, and livr. iii, pl. i.

[2] Trans. Prov. Med. and Surg. Association, N. S., vol. iii, 1847, p. 105.

[3] Diseases of the Chest. Translated by Dr. Forbes, 1834, note, p. 581.

these so-called abscesses communicating with the ventricle. The origin of *aneurism of the heart* is unquestionably often connected with degeneration. It may be formed in the mode just described, or by a portion of the heart more soft than the rest yielding to pressure, and bulging outwards.[1]

Four examples of this lesion, besides that first mentioned, will be found amongst the cases recorded here, (viz. 7, 19 and 27, Series I; and 25, Series II.) Leaving these textural changes for the present, we must now pass on to consider:

B. *The effects of fatty degeneration on the functions of the heart.*[2]—The most prominent of these effects are those which exhibit the deficient powers of the organ.

a. Coma.—Several writers have described coma, preceded or not by giddiness in connection with enfeebled powers of the circulation. Mr. Adams,[2] whose cases have been previously mentioned, observed as many as twenty attacks of coma in one of them. Mr. R. W. Smith and Dr. Stokes[3] have made similar observations. The explanation of these attacks is this, that the power of the heart is reduced, and thus it is rendered incapable of readily sending on the blood which it receives,—hence arises obstruction to the circulation and unequal pressure on the brain. The explanation is no doubt correct. Case 32, Series I, may be received as a confirmatory illustration. In this case there was much degeneration and fatty growth on the right side of the heart, the left being comparatively healthy. The right cavities were filled with blood. The patient, an old lady, had died from meningeal apoplexy consequent, apparently, on the obstruction to the free return of blood from the brain. In the Table, four of the first, and two of the second, series of cases died by coma.

b. Syncope.—Cardiac syncope is a term properly and more frequently used by the older writers[4] than by ourselves, notwithstanding the arguments of Bichat[5] on the subject.

[1] As described by Dr. Latham, loc. cit.
[2] Dublin Hospital Reports, vol. iv.
[3] Dublin Journal, vol. i, N. S., p. 491.
[4] Bonetus, Sepulchretum, &c.
[5] Sur la Vie et la Mort, art. 5.

Dr. Burrows,[1] in his interesting work on the Cerebral Circulation, has clearly established the fact, that syncope is due to a deficiency of that pressure within the skull which is essential to the performance of the functions of the brain. On this principle we can explain the frequency with which this symptom is found to occur in fatty disease of the heart. Numerous illustrations of the fact will be found in the Tables.

The case of an old man who fell under the notice of Dr. Williams and myself is very remarkable. I was one day suddenly called to him, and found him, as I myself and others believed, dead. He had been in his usual state, and taking his dinner a few moments previously. Though neither pulse nor respiration could be perceived, nor in a hurried examination could the sounds of the heart be heard (Case 6, Series I), I felt from something about his appearance that he was not dead. An electro-magnetic apparatus was set to work from the spine to the region of the heart; other stimuli were made use of, and after several minutes he slowly recovered. These fits, in a slighter form, recurred almost daily for two years, when he died in one exactly like the first. The heart exhibited fatty degeneration. In some cases this feeling amounts to nothing more than a sense of faintness, a feeling that the person must fall if he does not lay hold of something; and in some instances, as in a case at present under my care, this slight faintness is accompanied by an impression that he is about to die. Such persons do die. In the Table before us, death thus occurred by, as I propose to call it, *syncope lethalis*[2] —fatal syncope,—in thirteen cases out of thirty-three in Series I, and in eight out of thirty-five in Series II. This mode of death is in many cases instantaneous, in other cases death, though sudden, is not so rapid in its occurrence, the fatal faintness is progressive, and death may not occur for several minutes after its onset. (See Case 28, Series I.) Facts within my knowledge lead me to think, that many distinguished men have thus died, and that in this condition has lain the hidden and

[1] On Disorders of the Cerebral Circulation.—London, 1846.

[2] See Paulus Ægineta, Syden. Soc.'s edition, vol. i, p. 502; also Lancisi for Apoplexia Syncopalis. De Subit Mort, Romæ, 1707, p. 176.

frequent cause of many sudden deaths.[1] The paleness of the features, the unaltered state of the pupils, the absence of stertor, and the feeble action of the heart, enable us to distinguish these cases from apoplectic seizures when we see them before death. The age also at which apoplexy occurs most frequently, is not that at which we most frequently find fatty degeneration of the heart. For example, of forty-nine cases of apoplexy, forty-two occurred in persons under sixty, and seven only in those over sixty;[2] whereas, in seventy-nine cases of fatty degeneration of the heart, forty-one were above sixty years of age.

In the thirteen cases dead by syncope, mentioned in Series I, both sides of the heart were affected in five cases, the left side in seven, the right in one. Syncope, therefore, is connected chiefly with disease of the left side of the heart; in some of these cases the left side was flabby, dilated, and contained much blood. In two cases in which there was hypertrophy of the left ventricle, and the fatty degeneration had but little advanced, I found the ventricle rigidly contracted. It appeared as if the diseased fibres had permitted or excited an irregular action, "a spasm," in fact, "of the heart," and death by syncope from deficient pressure, equally in this case as the other, resulted.

c. Shortness of breathing is recordcd as having been present in about one half the cases in each Series. In some cases it appears as a sense of choking or suffocation,—the person feels as if breathing through a sponge. In some instances the difficulty of breathing is so slight, that it is scarcely regarded; in others so severe, that the slightest effort, particularly in mounting ascents, is most distressing. A peculiarity was observed in two subjects, one of which still lives, viz., that reading aloud caused no inconvenience, whilst it was distressing to ascend a gentle height.

[1] See several cases of sudden death, the heart in each being flaccid, flabby, and its cavities empty, described by M. T. Chevalier in the Transactions of the Society, vol. i, 2d edition, 1812, p. 156. He called the mode of death *asphyxia idiopathica.*

[2] See Observations on Cerebral Apoplexy, by the author.—London Journal of Medicine, vol. i, 1849.

d. Pain is another amongst the recorded phenomena connected with fatty degeneration of the heart. It was present in twelve cases of Series I, and fourteen of Series II. In eight of the first Series, and in eight of the second, it was confined to the region of the heart. In four of each Series it extended as in *angina pectoris* more or less over the chest and down the arm. The pain in some cases immediately preceded death, and was then, in nearly all the cases, found to be connected with rupture of the fibres of the heart. There is some evidence to show that rupture of a few fibres may occasionally occur without being fatal, and cause pain; but in the majority of cases, the pain appears to be due to over-distension of the cavities with blood on the one hand, or to the spasmodic contraction just alluded to on the other, it being remembered, that though the heart in health does not possess common sensibility, it may in diseased conditions acquire this property. These latter phenomena, that is to say, syncope, breathlessness, and pain may occur separately, or two or all of them may be present at the same time; their combination gives us the characters of the disease known as *syncope anginosa*, or *angina pectoris*. The symptoms or phenomena of this disease were very well recognised,[1] even before Heberden[2] or Rougnon,[3] who wrote at the same time, described them as constituting a special disease. Still, from that period to the present, the immediate condition on which they depend has been a source of great doubt. It would lead us from our present object to mention all the opinions on the subject. I shall refer to but a few, and those by some of the chief writers, which appear to be directly connected with the view now presented.

1. It is said, that the phenomena may occur in the absence of any lesion of the heart which can be recognised; such was Heberden's[4] opinion, and such is that of many other writers. It is very easy to conceive, that fatty degeneration,

[1] Amongst others, see Lancisi, De Subit Mort, 1707, p. 46.
[2] Medical Transactions; London, vol. iii, 1772.
[3] Lettre à Lorry sur une Maladie Nouvelle; Besançon, 1768.
[4] Commentaries, 4th edit.; London, 1816.

which has been overlooked so long, and by so many, might have been present in these cases. Indeed, Dr. Forbes[1] anticipates some such latent condition, when he says: "It is easy to overlook slight misproportions in the different cavities, and also various morbid conditions of the muscular fibre of the heart, which may have sufficed, nevertheless, to occasion the greatest distress or disorder in the action of the organ."

2. Ossification of the coronary arteries has been regarded by Jenner, Parry, Wall, Black, Burns, Jurine, Kreysig, and others, as one of the most frequent causes of angina pectoris. We have seen the close relation which exists between this condition and fatty degeneration. Different opinions have been entertained as to the mode in which the ossification of these vessels and the symptoms were connected. Some believe that the ossified vessels acted as mere mechanical irritants; others that the nutritive function of the heart and its power were impaired by the state of its blood-vessels. Jenner, Parry, Baillie, and Hodgson entertained this opinion.

3. Fothergill attributed the disease to the simple accumulation of fat.

Lastly, Frank, Jurine, and some others connected it with accumulation of blood in the cavities of the heart and great vessels. It appears to me, from a review of these opinions, which find a connecting link in the affection of the heart's texture now described, and from the general character of the symptoms, that its phenomena may depend on any cause which can produce irregular distension, or irregular contraction of either of the ventricles, and thus, whilst it tends to disturb the circulation through the lungs, can at the same time lessen the amount of pressure which should exist within the skull. This is not the place to discuss all the causes which may produce these effects. For the present, it is sufficient to show, as has been already done, that this degenerated condition of the heart's fibres is a very sufficient source in itself of the several phenomena, (viz. breathlessness, faintness, and pain,) which are recognised under the name of *angina pectoris*, or *syncope anginosa*. Many facts in reference to the age,

[1] Art. Angina Pectoris; Cyclop. of Pract. Medicine.

sex, and habits of life, under which these conditions respectively occur, confirm this opinion. Lastly, in the Tables of cases, five cases of true angina in connection with this state of heart will be found, viz. Cases 13 and 15, Series I, and Cases 2, 16, and 25, Series II, and I might add a sixth, recently communicated to me by Dr. Copland. Four other cases, recorded by Fothergill and Parry, will be found in Series III. With these remarks, I conclude what I have to say on the effects of fatty degeneration of the heart, on the structure and functions of the organ. The influence of *hereditary predisposition*, and the *duration of the disease*, are points still open to future investigation. I have found nothing which bears on the former subject in the recorded cases. In one of the cases recorded by myself, a sister had died suddenly in the street, it was said of diseased heart. In another case, the father of a gentleman who is living, but in whose heart I have no doubt the disease exists, died under similar circumstances.[1] In regard to the duration of the disease, it is not improbable, that its progress may be rapid in some cases in which the general nutrition is greatly depraved; in other cases, however, in those particularly which occur in advancing life, it is evidently slow in its progress. Thus some cases in the Table would seem to show, that it may have existed for two, five, ten, twelve, or fifteen years respectively.

V.—THE DIAGNOSIS OF FATTY DISEASES OF THE HEART.

It would be a refinement at present to seek to distinguish during life between the presence of fatty growth and fatty degeneration; I shall, therefore, allow what I have to say on the diagnosis of fatty degeneration to apply to fatty growth. I have already referred (in a note, p. 152) to the fact, that fatty degeneration of the heart is said to be frequently found after death, where its existence had not been suspected during

[1] Since the presentation of this paper, a case of fatty degeneration of the heart has come under my notice, in which the brother and uncle died suddenly of "diseased heart." It was said on post-mortem examination, that excess of fat on the heart was the cause of death in one of them.

life, and I have expressed an opinion, that such cases would not often be met with, if a full inquiry could be made into their symptoms. I feel the truth of this observation more particularly in those cases which occur in the progress of advancing life, when, whilst the system generally keeps up its powers tolerably well, the heart suffers from some local cause, such as diseased coronary vessels. In those cases, the balance between the system and the heart is lost, and phenomena, as clear and as pointed as any that can indicate the nature and seat of disease, are developed. Again, on the other hand, in those exhausting diseases in which the heart participates, it is quite possible, that the requirements of the system may not be disproportioned to the powers of the heart, and death may come on slowly and insidiously without our attention being attracted to the state of this organ. In the former class of cases we find, as *symptoms* of the disease, various modifications of the phenomena of drowsiness, coma, faintness, syncope, breathlessness, and pain in the region of the heart, as previously described. A patient complains, in the earlierst ages, of being easily exhausted, particularly by mounting heights; he feels, he says, faint, when he gets to the top of the stairs; though not giddy, he feels as if he must fall; and, though not breathless nor panting, sighs deeply, and seeks the air. Any unusual excitement, a heated or a close atmosphere, produces the same effects; at the same time, there is often experienced an uncomfortable feeling of choking, or fulness in the chest. In the intervals, the individual is pretty well. As the disease advances, the attacks become more frequent and severe, and often disturb and distress the patient at night. The temper has been observed to become irritable; in several cases, the expression of the features appears anxious, and frequently the countenance is sallow;[1]

[1] It has been recently demonstrated by Mr. Canton, that the *arcus senilis* of the cornea is a fatty degeneration of this texture. Dr. Williams has observed, that this appearance is very frequently associated with the phenomena here described as characterising the presence of fatty degeneration of the heart; and in one deeply interesting case, at the post-mortem examination of which I assisted, the diseased condition of the heart, to the

œdema of the legs, and copious perspirations from very slight causes, appear amongst the associates of the disease. The pulse is generally affected, but the mode in which it is so depends no doubt on the part of the heart affected, and on the extent and degree of the disease. Irregularity is one of its most frequent alterations, weakness is another, slowness a third. They are mentioned respectively, as having been noticed, seven, five, and four times in Series I; and, six, nine, and four times in Series II. The pulse is described as being regular only five times in the three series, never as being strong. It is mentioned as being full (three times), once as being hard, and once wiry and small, in a few cases as being quick or easily excited. In general, weakness, irregularity, and slowness[1] of the pulse, are the characters which we most frequently find. The irregularity may not be constant; I have seen it present during the slight attacks above described. I have seen it disappear altogether while the patient was in tolerable health, to return, as the effect of any depressing

diagnosis of which the state of the cornea contributed, was most marked. Mr. Canton has further informed me, that he has constantly observed the degenerated condition of the heart in the cases of well-marked *arcus senilis*, which he had an opportunity of examining. (See also the 'Lancet,' vol. i, 1850, p. 561.) Thus, then, when the signs and symptoms of fatty degeneration of the heart are present, this appearance of the cornea will greatly aid in the diagnosis. It must not, however, be forgotten, that fatty degeneration of the heart may occur under circumstances and at an age when we would not expect to find this lesion of the cornea; so likewise, but in a much less degree, we may expect to find the change in the cornea independently of change in the heart. Dr. Williams attributes the arcus to the pressure of the lids on the upper and lower margins of the cornea. The shape and mode of formation confirm this idea.

[1] The slowness of the pulse is sometimes quite remarkable. In one case (No. 6, Series I), the pulse was as slow as twenty-four in a minute when the patient was lying down, and never above thirty-two. There is an interesting communication by Dr. Stokes in the 'Dublin Journal,' August 1846, p. 73, in which he seeks to show the connection between slow pulse and disease of the aorta, or its orifice. I am disposed to think that the soft, flabby, feeble, if not fatty, state of the heart, which was present in all his cases, is more intimately connected with the state of the pulse than the aortic disease, which does not appear to have assumed a constant or uniform character in any of the cases.

cause, the more marked because that cause may be far too inefficient to affect a sound heart. As the disease advances, the symptoms become more marked, the various effects of languid and feeble circulation show themselves; angina pectoris is perhaps fully developed, or the patient is cut off suddenly by some one of the effects connected either immediately or remotely with the lesion itself. Of the eighty-three cases comprised in the three Series, sixty-eight died suddenly! The *physical signs* which characterise the disease are few, but very distinct in some instances. They are a feeble impulse of the heart, proportioned to the extent and degree of the disease; a feeble first sound, scarcely audible in some cases; and when the heart is enlarged, there is extended dullness. M. Rokitansky suggests, that disease of the columnæ carneæ may cause imperfection in the action of the valves with which they are connected, and thus give rise to a murmur. In two cases, the second sound is said to have been feeble or imperfect. This, it appears to me, may depend on the dilatation and fulness of the ventricle, preventing a perfect action of the semi-lunar valves. Taking these symptoms and physical signs together, and ascertaining at the same time the absence of other causes which may produce some more or less like phenomena, we can, I am satisfied, generally form a very correct diagnosis as to the presence of the disease.

VI.—THE TREATMENT OF FATTY DEGENERATION OF THE HEART.[1]

We have no evidence to show, that we can restore muscular fibres which have been destroyed; all, therefore, that we can hope for in these cases, and that not always, is to arrest, or

[1] On the treatment of fatty growth on the heart, I have nothing to add to those general principles which may be founded on the causes which produce the disease as already described, p. 138. See, for the effects of alkalies, 'Dict. de Méd. et de Chir. Pratiq.,' art. Obesité, by M. Roche; and also, Dr. Fothergill, on the Effects of Abstinence &c., 'Med. Observ. and Inquiries,' vol. v; and the article "Obesity," by Dr. Williams, 'Cyclopædia of Practical Medicine.'

suspend for a time, the progress of the disease by improving the quality of the blood, and thus supporting the vigour of those portions of the heart still uninjured. The nervous powers being at the same time strengthened, and the blood itself rendered a better stimulant. The effect of treatment calculated to promote these objects is often very striking. I have found attention to the digestive organs, in the first instance, useful; bitter tonics, with alkalies, and subsequently iron in different forms, seemed to act most advantageously. I need not, in a communication already so prolonged, enumerate the habits of life, change of air and scene, dietetic regulations, &c., by which the general health, and with it the part most in need of it, may be improved. In reference to some of the symptoms, I might mention, that I have seen in two or three cases great relief from pain experienced by the repeated application of three or four or more leeches over the region of the heart, followed by a blister. In one case, which I saw with Mr. James W. Ilott, of Bromley, some short time ago, attacks of distressing angina ceased for several months, (when the patient died of another disease,) after the application of leeches three or four times, and the internal use of iron. Exercise has recently been recommended in the treatment of these affections. The patients cannot take it, if it were desirable that they should do so. If exercise can be taken in the early stages of the disease, it should always be short of producing fatigue. Case 19, Series II, illustrates the ill effects of over exercise, even as a curative agent. Cases 23 and 25 show in a different way the dangerous effects of over-exertion. It may well be borne in mind, that narcotics are given with risk in these cases. One death occurred after an accustomed dose of morphia; another during the inhalation of chloroform. On the other hand, it is needless to indicate the usefulness of antispasmodics in these cases during paroxysmal attacks.

Such, then, are the chief results of my investigation on the subject of fatty diseases of the heart; and on looking back at the catalogue of evils which we have traced in connection with a disease which has hitherto almost escaped

observation, I cannot help saying, with one of our illustrious predecessors,[1] "Vides novum exemplum humanæ calamitatis! ubi insons blandus pinguis humor . . . tam diros, tam mirabiles, tam insanabiles morbos, mortem-que tandem ipsam produxit."

In concluding these observations, I have to apologise for the length to which they have extended, and to plead the importance of the subject itself, as well as its numerous relations. I trust that the difficulty of doing justice to such a subject in an essay, even of this length, will be found a sufficient explanation of such imperfections as it contains, and that these imperfections will be attributed to this cause, and not to any want of zeal on my part, in rendering it worthy of acceptance by this distinguished Society.

[1] Boerhaave. Atrocis rarissimique morbi historia altera.

SERIES I.—*Containing the abbreviated histories of Thirty-three cases of Fatty Degeneration of the Muscular Tissue of the Heart.*

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
1.	Dr. Peacock, Edin. Journ. of Medical Science. 1844.	M.	48	A horsekeeper, of intemperate habits, was suddenly seized with great prostration, constant vomiting, coldness of the extremities, and died in eighteen hours.	In a state of prostration.	Pericardium adherent. The heart enlarged, and much covered with fat. Fatty degeneration of the muscular parietes of both ventricles. The fibres being studded with oil-globules, and the striæ being absent or scarcely traceable. There existed an aneurism of the ascending portion of the arch of the aorta, communicating with the right auricle by two openings, each the diameter of a large bougie, and surrounded by a belt of granular lymph.	In the other organs there was nothing very peculiar. The pylorus was contracted.
2.	Idem.	F.	29	Died whilst labouring under an attack of pleuro-pneumonia. No further history had been kept.	Pleuro-pneumonia.	The heart weighed 11½ oz. No fat externally. The walls of L. V. were mottled, and in some parts of a pale yellowish brown colour. The musculi pectinati of R. V. and columnæ carneæ of L. V. were of a pale clay colour. No trace of striæ on the muscular fibres, which were converted into fatty matter. The tissue was greasy, and resembled an advanced stage of fatty liver.	The liver large and fatty. The spleen pale. The kidneys large, pale, and greasy looking. No tubercles in the lungs.
3.	Idem.	F.	30	Suffered from dyspnœa on exertion, from slight jaundice, and dropsical symptoms. Dullness more extended than natural in the region of the heart, and a murmur with the first sound.	Comatose.	The condition of this heart similar to the last. The presence of fat, and the change in the muscular fibres, were distinctly followed. No blood in the cavities.	Liver large and fatty. The kidneys mottled. No tubercles in the lungs.

4.	Dr. R. Quain, 1845.	M.	55	Of sedentary occupation, and subject to palpitations for ten years. During the last two years of his life the heart's action was irregular—not constantly, but particularly after going upstairs. For four years had occasional pain at one spot near the apex, this point was tender on pressure. Dyspnœa very distressing during last nine months of his life. Urine bloody and albuminous. Anasarca. Signs of hypertrophy. No murmur. Death from exhaustion.	Exhaustion.	Heart large (estimated at 18 or 20 oz.) Little or no fat beneath the pericardium. Left V. hypertrophied, and its cavity dilated. L. A. dilated—much dark-coloured coagula in both. The R. V. not much dilated nor hypertrophied. Much black blood in both R. A. and R. V. No valvular disease. Orifices all free. The muscular substance felt firm, but was pale, mottled with spots of a lighter colour, which, when examined with the microscope, were found composed of granular fatty matter.	Atheromatous deposits in the aorta. Kidneys enlarged.
5.	Idem. 1845.	M.	60	A gentleman, very stout, declined going on the outside of an omnibus, not feeling well. He got inside, his head was observed to droop, and he died instantly.	Syncope.	The heart weighed 15 oz., and was loaded with fat. Muscular substance mottled with yellow spots, soft, and easily broken. Much blood in all the cavities, and in the vessels of the neck.	Much fat under the integuments. Rather more serum than usual within the skull. Lungs healthy.
6.	Dr. Williams and Dr. R. Quain, 1845.	M.	84	A tailor, very thin and feeble; complained of weakness, cough, and shortness of breathing. Extended dullness existed in the region of the heart, also feeble impulse: first sound not loud, second distinct. He was seized one day with a singular attack of syncope, from which he was with difficulty aroused by the use of the electro-magnetic apparatus. He had two or three fits in the course of the week following, less severe. His pulse, whilst under observation, did not exceed 32, and was as low as 24. After two years he was	Syncope.	The heart weighed 17 oz., and was covered with yellow fat. Its substance soft, of a pinkish-yellow, mottled hue, and its cavities contained bloody and fibrinous coagula, more in left than right. Atheromatous deposits on the mitral valve, in the coronary arteries, and along the aorta. The transverse striæ were obscurely seen, and there was much oily matter in the tissue.	The body very thin. The liver small, firm, but apparently healthy.

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks
				seen again—he had been constantly subject to the same kind of fits. He was now much feebler, and died in one of them.			
7.	Mr. Meade, Med. Gaz., vol. xxxviii, 1846.	M.	88	A very fat old gentleman had for two months before his death complained of cough, and weakness—his pulse full, but jerky. On the morning of the day he died, he had walked half a mile to church, and back. He died suddenly, after getting into bed.	Rupture of the heart.	The pericardium covered with fat. The muscular substance degenerated, and (towards the apex of L. V.) of a dirty-yellow colour; soft, and quite fragile. The lower part of the ventricle had bulged out, so as to form a sort of pouch. The internal membrane and muscular substance having given way previously to the pericardium having done so. There was a rupture here (at the back of L. V.) about three quarters of an inch in length. Mitral and aortic valves ossified.	Lungs healthy. No free fat noticed in the blood.
8.	Mr. Crisp, Pathol. Soc. of London, Nov. 1846.	M.	73	Had been treated for diseased prostate. He complained of pain and uneasiness in the region of the heart,—experienced relief, and died suddenly, after six hours.	Rupture of the heart.	L.V. hypertrophied. Adipocerous matter mixed with the fibres. Rupture through the back part of L. V.	Liver granular.
9.	Dr. R. Quain, 1846.	M.	72	A gentleman, very corpulent, had in consequence of an accident taken limited exercise for the last twelve years. He had long suffered from stricture of the œsophagus. For the last two years he slept badly, was restless, irritable, and complained of pain in the lower part of the chest. His tongue dry and brown. His pulse full, regular, not strong. During a few weeks preceding his death, he felt	Rupture of the heart.	The heart weighed 18 or 20 oz., and was loaded with fat. The muscular substance of a pinkish-yellow hue, very soft and friable. Spots of mottling appearing under the lining membrane. The muscular fibres had undergone, over the greater part of the L. V., fatty degeneration, and also in the right, but to a less extent. A rupture across the fibres in posterior wall of L. V., about three quarters	Body very fat. Limbs less so. Liver large, coarse in texture.

				feebler, and in walking a short distance was obliged to stop frequently, as if for breath. The heart's sounds were both feeble, particularly the first. His pulse was intermittent at the last. He died during the night, having gone to bed in his usual state.		of an inch long—internally it was circular, about a quarter of an inch in diameter, and situated between the muscular bands. The wall here was eight lines in thickness. A large branch of the coronary artery, leading to the rupture, was almost entirely obliterated by ossific deposit.	
10.	Mr. Key and Mr. Woollaston.	F.	55	Of irritable temperament. Suffered principally from headache, and languor of the circulation. Her complexion was sallow, and she frequently complained of being "bilious." She died in a moment.	Syncope.	The heart small, and much covered by fat. Its tissue pale, soft, and exceedingly friable. The fibres had undergone fatty degeneration.	Liver about the usual size, presented the characters of cirrhosis in a moderate degree.
11.	Mr. Cadge.	M.	65	A physician, retired from practice, fat, robust, general health good; of sedentary habits. Complained of uneasiness in the region of the heart, which led him to say that he would die from heart disease. On going up stairs, after breakfast, he fell down insensible,—his breathing oppressed, but not stertorous. He died in eleven hours.	Coma.	Heart large, and somewhat loaded with fat. Muscular structure softened, fatty, easily torn, of a leaden hue, more resembling boiled liver than muscular tissue. The coronary arteries extensively ossified throughout their whole length.	No appearance whatever of disease in the brain.
12.	Dr. Latham, Clinical Medicine, vol. ii, 1846, p. 169.	M.	61	Crippled for several years, by the effects of gout. Never intemperate, now abstemious, but fat. He had severe pain for two or three days across the chest,—his pulse, as usual, hard and incompressible. The pain continued next day,—heart's impulse extended. The pain ceased for three days, then returned more violent than previously. He was pale, cold, heart's action regular, murmur for the first time	After eighteen hours' suffering, by rupture of the septum.	The heart, larger than natural, was encased in fat, chiefly at the right side. The muscular substance thin and flabby, but retaining its colour and character. The L. V. dilated and hypertrophied, the muscular substance healthy, whilst that of the septum had undergone fatty degeneration, and in it there was a rent an inch and a half long at the left side, and a point merely at right side, the ventricles thus	Interior structures loaded with fat.

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
				in præcordial region, not in the arteries. He died in eighteen hours from last attack, his intellect remaining clear.		communicated. The coronary arteries were pervious, but contained atheromatous deposits.	
13.	Dr. Peacock, 1846.	F.	60	A nurse, had cough, and remarkably characteristic symptoms of angina pectoris. The heart's sounds were not well pronounced. Pulse very feeble; irregular. She died in a paroxysm.	Syncope. Anginosa.	The heart was increased in size, and loaded with fat, particularly at the right side. The muscular substance had undergone fatty degeneration in a marked degree. It was most evident towards the inner surface of the L. V., and amongst the musculi pectinati and columnæ carneæ of the right side. The tissue was quite soft in the wall of L. V. Beneath the lining membrane of R. V. were some portions of pure fat. The coronary arteries were extensively ossified and obstructed.	Aorta extensively diseased.
14.	Mr. Stallard, Trans. of Provincial Association, vol. iii, N. S. 1847, p.105.	M.	60	An inmate of a workhouse, short, thick-set, of florid complexion, was suddenly seized, whilst at work, with coma, cyanosis, and great prostration. Pulse full, feeble, 60. Respiration slow. Heart's sounds feeble. He was next day better, remained so for two days, and was then found dead.	Sudden.	The heart larger than usual, fat, flabby, and degenerated. In the substance of the left ventricular wall at the apex was a cyst, irregular in shape, projecting into the ventricle, separated from it by the thickened endocardium, and communicating by a fissure through the membrane. This cavity contained a bloody, purulent-looking fluid. In the wall of the same ventricle were observed several fissures, containing dark-coloured, fibrinous material, and some of these communicated with the cavity. The coronary arteries were much ossified.	Cavities of pleura contained dark coloured serum. The organs presented the appearance of poisoned blood. Liver soft. Kidneys contained cysts, and were granulated on the surface.

15.	Dr. R. Quain, 1847.	M.	47	A tailor, of temperate habits, had for several years complained of pain in the region of the heart; being worse than usual one evening, he sought advice from a surgeon, who gave him some ether, with a view of relieving "angina pectoris." He walked home, felt better, but was found dead next morning.	Sudden. Cardiac apoplexy.	Considerable amount of fat on the surface of the heart. No enlargement. Fatty degeneration of both ventricles, but chiefly of the upper part of the R. V. Effusion of blood in the degenerated tissue. Ossification and diminution of the caliber of the right coronary artery.	Body not fat. Brain not diseased. Old tuberculous disease of lungs. No disease of the abdominal organs.
16.	Mr. Savage, Provincial Medical and Sur. Journ., 1847, p. 131.	M.	Aged	Of intemperate habits. No symptoms appear to have preceded death, which occurred sudenly after walking.	Rupture of the heart.	Heart enlarged—coated with fat. The muscular fibres degenerated, having lost their cross markings—fat in abundance. Rupture through lower part of L. V. in front—coronary arteries ossified.	Body fat; the liver enlarged.
17.	Mr. Sankey, Pathological Soc., June 1847.	M.	44	Had been ill for five days, and then admitted to the Fever Hospital. His complexion sallow; slight anasarca, petechiæ, relaxed bowels. Death on the fifth day.	Not stated.	Enlarged. Spots of fatty degeneration in both ventricles.	Slight emphysema of the lungs. Some ulcers in the colon. Kidneys healthy.
18.	Mr. Corfe, Med. Times, Dec. 9, 1848.	M.	50	Stout, well formed, had been in good health, but complained one morning of slight pain across the abdomen, which he thought to work off in ramming stones after paviors. He reeled, fell, and died, after being two hours at work.	Syncope. (?)	All the chambers contained dark fluid blood—the whole organ was dilated in its cavities—the L. V. dilated to half its natural capacity. The walls of L. V. pale, soft, flabby, friable; the cavity collapsed when laid open, as did also those of the right.	Congestion and ecchymotic spots on several parts of the alimentary mucous membrane.
19.	Dr. Jenner, Med. Gaz., Dec. 15, 1848.	M.	70	Of intemperate and indolent habits. Two years before his death was suddenly seized one evening with a sense of faintness, dyspnœa, &c. He had a similar attack next day,—then relief. His pulse was irregular for several months (if not longer) before his death,—stated to have	Coma.	The left ventricle thickened from deposit of fat on its surface, presented the characters of fatty degeneration. There was a well-marked aneurism at its apex. The degenerated texture appeared spread out on and then lost on the walls of this small sac. Atheromatous deposit on the	

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
				had suppression of urine, and this to have been the cause of coma.		valves, no appearances of inflammation having previously existed.	
20.	Dr. Beck.	F.	24	Stout, of bustling habits, suffered from oppression at the chest and difficulty of breathing, having sometimes to stop when walking and gasp for breath. After an easy confinement, suffered from symptoms of peritoneal inflammation, for which she was bled to the extent of 10 oz. in a sitting posture without feeling faint: felt better during the day. She died the same night suddenly.	Syncope.	Much fat on the surface of the heart. Substance soft, discoloured, of a brown paper colour, mottled on the inner surface —seen to be infiltrated with fat, when examined with the microscope.	Evidence of general peritonitis. Liver and kidneys fatty.
21.	Dr. Waters.	M.	72	Very corpulent, sedentary, temperate. Suffered from shortness of breathing, vertigo, and frequent faintings. Pulse small, regular. Complained one summer-day of great heat, and of distress in breathing. In half an hour afterwards he was found dead in a chair.	Syncope.	Enlarged—cavities dilated, particularly the left ventricle, and full. The muscular substance pale, soft, with spots of "fatty degenerescence." Coronary arteries healthy (?).	Liver enlarged: nothing particular in the other organs.
22.	Idem.	M.	22	Appeared to have been in good health, lived regularly, more confined to an office for some time before his death than previously. He died suddenly whilst inhaling chloroform previously to the extraction of a tooth. "The quantity of chloroform could not have exceeded twenty minims."	Sudden.	The heart about the ordinary size—not particularly fat on the surface. The muscular substance pale and flaccid. The cavities contained clots of dark grumous blood. Wall of L. V. thin and "interspersed with fatty degenerescence." Mitral valves unequal at the edges, and rugose. Some roughness on inner surface of aorta.	Abdominal parietes fat: omentum contained much fat. Liver greatly enlarged, and in a state of fatty degeneration. Vessels of brain congested. Other organs healthy.

23.	Dr. R. Quain, 1848.	M	60	A clergyman, very irritable, had suffered for several years from disease of the urinary organs, his urine generally abundant, occasionally contained a little albumen. Accustomed to take a small dose of morphia every night to relieve pain. One night, after his usual dose, retired to his room, and was found on the following morning dead in his chair.	Syncope (?)	Not much fat on the surface. Six oz. of bloody serum in the pericardium. Left ventricle hypertrophied and firmly contracted. Fatty degeneration of the columnæ carneæ, and probably of other parts of the ventricle. The left auricle contained some blood—the right cavities much more. The coronary arteries were not examined.	Nothing in the brain to account for death. The kidneys enlarged, contained cysts. The liver soft and mottled. Some crystalline scales obtained from the blood were believed to be urea: the prostate enlarged. Bladder much thickened.
24.	Dr. Peacock, Proceedings of the Pathological Soc., 1849.	M.	32	An intemperate man: had suffered ten or twelve years before his last illness from rheumatism. Six or seven weeks before his reception into hospital, he was stated to have had another attack. When seen he was sinking; he was delirious or semi-comatose at intervals; had urgent attacks of difficult breathing, and was dropsical. Dullness extended over the heart's region, double murmur at the base. Died comatose.	Coma.	Old lymph on the pericardium. Heart weighed 16 oz. One of the aortic semilunar valves destroyed, and the fibrous portion of the septum almost perforated. Signs of recent as well as old pericarditis. Fatty degeneration of the fibres of both ventricles.	Kidneys in a state of advanced disease.
25.	Dr. Parkes and Mr. Cadge, 1848.	M.	54 (?)	A porter, temperate, not fat, had for fifteen years suffered from winter cough. Last two winters worse, and he suffered from extreme dyspnœa; also from faintings. His pulse then slow (30), irregular, and	Syncope.	Larger than natural, and rather more than usually covered with fat. A white patch over right V. and A. The walls of the ventricles were soft, friable, and interspersed with yellow spots, which proved	Rather more serum than usual in the ventricles of the brain.

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
				unequal. These symptoms became worse; his pulse permanently and remarkably feeble and irregular; and any exertion brought on the faintings. There were signs of moderate emphysema and of slight enlargement of the heart. The first sound was short; both sounds low and muffled, sometimes remarkably so. He dropped dead suddenly. (Dr. Parkes.)		to be oily particles. The fibres, so far as recognised, had lost their striæ, and were unsound. Aorta studded with atheroma, and the right coronary artery especially so. (Mr. Cadge.)	Lungs emphysematous. Right kidney contained two large cysts. Both kidneys otherwise healthy.
26.	Mr. Avery and Dr.R.Quain, 1849.	M.	76	A well-proportioned man, of regular habits, not fat; was known to have suffered much from distress in breathing, and was found dead on a door-step, a short distance from his home. Marks of a blister on his chest.	Rupture of the heart.	Serum and coagula, exceeding a pint and a half, were found in the pericardium. The heart about the usual size, with the ordinary amount of fat on the surface. The muscular substance *everywhere healthy* in colour, &c., *except at the back of the left ventricle, where there was a large fawn-coloured patch*, close to the septum, extending upwards, from the apex towards the base. Through the substance of this patch, a rupture of the tissue had occurred, implicating some of the muscular bands at the apex. *The fawn-coloured tissue presented marked degeneration of the fibre, and the coronary artery leading directly to it was extremely ossified.* (Dr. Quain.)	——
27.	Dr.Fletcher, Provincial Medical and Surgical	M.	44	Thin, nervous, active in business. Seized with severe pains across the chest, which extended to the back, and slightly to the arms, with a distressing sense of suf-	Sudden.	The heart dilated, but not hypertrophied. Much fat over R. ventricle. Fatty degeneration, with disappearance of the transverse striæ in the muscular fibres of the	Nothing very remarkable in the other organs.

	Journal, 1849, p. 606.			focation. His pulse and the heart's action then excessively irregular. These fits recurred at frequent intervals, with some modification, for eight days, when he died suddenly. In the period between the fits, he was free from suffering; his pulse regular (74). Nothing peculiar in the heart's sound.		L.V. On the internal surface of the apex of this ventricle, the muscular substance was softened and disorganized, and it contained a clot, firm and fibrinous (½ oz. in weight), such as is found in an aneurismal sac. Both coronary arteries diseased and contracted.	
28.	Mr. West and Dr. R. Quain, 1849.	M.	53	A stout man, of an anxious expression, temperate in eating and drinking, more sedentary in his habits last few years of his life than formerly, and stouter last five. (One of his sisters died, at 48, suddenly, in the street.) Healthy, save attacks of bronchitis. Last eighteen months has felt frequently a sensation of faintness or sinking; and, on any excitement, felt violent pain in the chest, and down the left arm. Sweated profusely on any exertion, and at night. Died suddenly, having complained of pain across the umbilicus. He remained conscious during the few minutes which preceded death, the pulse becoming gradually fainter.	Syncope. (?)	The heart enlarged, dilated, especially L. V., and much covered with fat. The muscular substance of L. V. (much less of right) soft, flabby, of a dull, brownish-red colour, mottled with buff-coloured spots, in which fatty degeneration was clearly traced. Both sides of the heart contained some blood, the quantity not ascertained. Both coronary arteries much obstructed by deposits.	1½ inches of fat beneath the skin. Ossified deposits in aorta. Left kidney much atrophied; a large calculus in its hilus. Right kidney soft, enlarged, contained a good deal of granular matter. Nothing remarkable in brain or liver.
29.	Dr. Parkes, 1850.	F	9	Out of health for some time. Had cough and enlarged cervical glands; then suffered from cancrum oris, implicating the whole of the left side of the face. She died on the sixth day, a partial separation of the slough having occurred. Pulse quick, not irregular.	Cancrum oris.	The whole muscular substance of the heart studded with buff-coloured specks, seen beneath the endocardium and in the parietes. The buff-coloured spots were found to consist of oil-globules, within the sarcolemma. The heart otherwise healthy.	The cervical and bronchial glands were enlarged. No tubercles. Slight old pneumonia. Recent fibrinous deposits in the spleen.

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
30.	Dr. Lankester, 1850.	M.	34	A carpenter, of temperate habits, had long suffered from a variety of symptoms of a nervous character. He was frequently seized with a sensation of faintness and giddiness, accompanied by palpitation and a sensation of choking in the throat. Pulse slow and small, often as if about to stop, but easily quickened by any excitement. Subject to profuse perspiration on exertion, and at night. He died suddenly, whilst drawing a truck.	Rupture of the heart.	Heart about the usual size, and well covered with fat. Pericardium filled with serum and coagula. The walls of all the cavities attenuated, particularly those of right auricle. Through the walls of this cavity, across the fibres, a rupture, $\frac{3}{4}$ of an inch in length, had occurred. Fatty degeneration of the fibres of this auricle and ventricle was found in several spots. The left cavities were not examined.	The other organs were healthy.
31.	Dr.R.Quain, 1850.	F.	26	A servant, had for many years suffered from dyspepsia. Two years before her death she had profuse, dark-coloured hæmoptysis. Subsequently, symptoms of tubercular disease presented themselves, and became chronic. She was thin naturally, and did not lose much flesh. Menses irregular and scanty. Dyspeptic symptoms continued. A month before her death, she complained of great distress in breathing on exertion. In the week following, she daily or nightly experienced an attack of faintness, giddiness, and sense of suffocation. Having spent the day as usual, she found herself at night very faint, lay on the bed, and died "as if in a sleep."	Syncope.	The heart of good size, as a whole, and no scarcity of fat on the surface. Inner layer of muscular tissue of the L.V. was of a dull red or buff colour. It presented throughout an early stage of fatty degeneration. The tissue of R.V. was thin, of a tawny colour and leathery feel; was also degenerated. The right auricle and ventricle filled with coagula.	The body thin. The lungs presented all the characters of chronic phthisis. The liver large and fatty-looking. The left kidney large, pale, and soft. Other organs healthy. (The heart alone was obtained for microscopic examination.)
32.	Dr.R.Quain, 1850.	F.	65	A lady extremely fat, lived temperately, but took very little exercise in consequence	Apoplexy.	Heart large, covered with fat, particularly the right side, where the fat	Extensive meningeal apo-

				of a painful bunion. Suffered from an attack of liver disease six months before her death. Frequently complained of "spasmodic pains in the stomach." She suffered from difficulty of breathing and from headache, and for a few days before her death from a dull pain in the region of the heart. She died suddenly after some slight exertion.		had greatly intruded on its walls. The fibres were traced with the microscope, buried in the fat. This ventricle and the auricle were filled with coagula. The muscular fibres were in several points degenerated, so also in the L. V.; this was comparatively empty, it felt firm, the right soft and flabby. Atheromatous patches in the coronary arteries.	plexy was found in the head: the chest small. Old tubercles in the lungs. The liver large and soft—calculi in gall bladder, which was ulcerated. The kidney large and soft, and contained much granular matter.
33.	Dr. Williams and Dr. Young, 1850.	F.	32	A lady had long suffered from shortness of breathing (always worse when weakened from any cause), supposed by practitioners who had previously seen her to be due to dyspepsia. In the autumn had suffered from slight illness, with a feeling of discomfort in left side. In the middle of December, whilst walking against a cold wind, was seized with, and suffered subsequently for three weeks from, pain in the left side, palpitation, dyspnœa, and a feeling of flurry and uneasiness, with flatulent distension. The pulse irregular, extremities cold,—signs of moderate hypertrophy, with loud systolic murmur beneath the left breast. She suffered from sickness and faintness at the close; had several attacks of syncope, in one of which she died.	Syncope.	The heart increased in size rather, and more than usually covered with fat. Fatty degeneration in the fibres of the right ventricle. Evidences of old endocarditis in the left ventricle,—the cordæ tendineæ of anterior lamina of mitral valve being destroyed. There were deposits of fibrous tissue, like firm lymph, in the walls of the left ventricle, near the apex. Mixed with this, and in many of the muscular fibres, were particles of molecular fat. The tissue of both ventricles was of a pale tawny colour, and all the cavities contained blood. There was an effusion of recent lymph to a slight extent in the internal and external surface of the posterior wall of the left auricle.	The other organs could not be particularly examined.

SERIES II.—*Containing the abbreviated histories of Thirty-five cases in which the tissue of the Heart is described as being pale, soft, flabby, or friable, with more or less deposit of fat on the surface.*

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
1.	Dr. Wade, Med. Obs. and Inquiries, vol. iii, 1767, p. 69.	M.	52	Having led an active life, he became indolent. Was attacked with hæmoptysis, and then had difficulty of breathing and of swallowing. Pulse slow, but excitable. His breathing was rendered distressing by any movement, but he could read aloud or call out without inconvenience. Subject to giddiness in the head. He became restless, anasarcous, and died under an aggravation of his preceding symptoms.	Gradual.	Much fat in the anterior and posterior mediastina. The heart was buried in fat, the muscular substance flaccid and withered.	No remarkable external corpulency. Abdominal viscera loaded with fat. Liver large. Probable duration five years.
2.	Mr. Hodgson, Diseases of the Arteries, 1815. Case 8.	F.	70	A corpulent lady had for six years suffered from difficulty of breathing. In 1811 she had an attack apparently apoplectic. The difficulty of breathing then increased. She had constant pain under the sternum, a small intermitting pulse, and syncope on the least exertion. Six months after the attack above mentioned, she felt intense pain in the region of the heart—her breathing hurried and difficult; she died suddenly after eighteen hours.	Rupture of the heart.	The heart abounded in soft fat. Its muscular fibres attenuated and flaccid, more especially at the seat of a rupture situated on the anterior surface of the left ventricle near the apex. This was an inch in length internally, a quarter of an inch externally. The coronary artery distributed to the left side of the heart was obliterated by ossification.	The lungs healthy.
3.	Idem. Case 6.	F.	Elderly.	Had suffered from palpitations, irregular action of the heart, vertigo, and swoonings. She died suddenly.	Sudden.	The heart small. The muscular substance of a pale brown colour, and so soft as to be easily torn by the finger. The coronary artery (there was but one) was extensively ossified.	——

4.	Dr. Duncan, Edin. Med. Sur. Journ., vol. xii, 1816, p. 59.	F.	22	Attacked with rheumatism and symptoms of pectoral disease. Relief of the former in ten days. Persistence of the cough; expectoration, and great pain in the region of the heart. Dyspnœa on any exertion. Relief. Return of the symptoms in an aggravated form, with inability to lie down. Anasarca, quick pulse. Death in little more than a month after the return.	Exhaustion.	Evidences of old and recent pericarditis, pericardial surfaces being adherent. The heart larger than usual, was covered with lymph. Under this two thirds of the heart's walls were converted into a substance having the physical properties of condensed fat. The remaining third had almost lost its muscular appearance. Mitral valve beset with ossifications.	The lungs healthy. Marks of chronic pleuritis.
5.	Fischer en Hufeland's Journal, der Pract. Heilkunde, Decem. 1819.	M.	68	Having been a prey to profound grief, whilst walking was seized with intense pain at the epigastrium, this extended to the region of the heart and left shoulder —had intermissions and increased severity. Pulse irregular—death on the fourth day. The left arm had been "numbed" for last two days of life.	Rupture of the heart.	Pericardium covered with fat. A thick layer surrounded the base. The tissue of the heart pale and soft. A rupture in left ventricle, which was in length one and a half inch externally, and about half an inch internally.	Muscles of the body generally softer than natural. The viscera were healthy.
6.	Mr. Adams, Dublin Hosp. Reports, vol. ii, 1827, p. 396.	M.	68	A man of full habits; in consequence of distress in breathing and cough was unable to use exertion. Oppressed by stupor; his breathing irregular, his pulse 30. Subject to repeated attacks of coma (no paralysis) and stertor, œdema of the feet, and final aggravation of these symptoms.	Sudden, in a state of coma.	The walls of right and left ventricles, and the septum, were almost entirely composed of fat, which showed in spots beneath the lining membrane. The muscular tissue of L. V. not more than a line in thickness (resembled liver) was soft and easily torn. Much fluid blood in the heart—aortic valves rigid.	Some fluid beneath the membranes of the brain. Left lung seemed impervious to air. Liver seemed healthy.
7.	Idem, p. 402.	F.	60	A lady of corpulent habit was seized with pain at the epigastrium, which continued for twenty-four hours. She was seized with vomiting; when this ceased she sighed and expired.	Rupture of the heart.	The heart unusually loaded with fat, and the muscular substance remarkably soft. A rupture one inch in length in anterior wall of L. V.	Much subcutaneous fat. Liver enlarged and irregular on the surface. Gall bladder contained six calculi—one in the mouth of cystic duct.

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
8.	Mr. Adams, Dublin Hosp. Reports, vol. ii, 1827, p. 403.	M.	—	Marked apoplectic symptoms, was bled and had an issue inserted. Died in a week after in the water-closet.	Rupture of the heart.	The whole surface of the heart was coated with fat. The muscular substance soft and flabby. A rupture in anterior and upper part of L. V. Vessels of heart healthy.	Brain, &c., sound.
9.	Idem, p. 443.	M.	68	A physician living freely had, during ten years, been subject to attacks of syncope. Had a cough for six weeks, and was then seized with pain and numbness in the region of the heart. No pulse to be felt in the right arm,—very weak in the left. Then not to be felt anywhere. His breathing oppressed. Restlessness came on. After seven weeks, died in a state of stupor.	In a state of stupor.	Large, flabby, and of a yellow colour, from fatty deposit. All the cavities distended with fluid blood. Aortic valves ossified, and the coronary arteries most extensively so.	Slight œdema of legs—slight old pleurisy of right side. Probable duration ten years. Mr. Adams considers that partial paralysis of the heart consequent on impaired nutrition connected with the coronary artery may have been the cause of the chief symptoms in this case.
10.	H. Simeons Heidelberg Klinisch Annalen, 1827.	F.	Young.	Her father syphilitic. Herself of a scrofulous habit, and very subject to rheumatism. Sleepless—easily fatigued. Subject to faintings. Pulse frequent—regular. A sense of burning heat internally, (within chest?) Lividity of hands and face. Feeble pulsation of the heart. Aggravation of these symptoms and death.	In a state of exhaustion.	Adhesions between the pericardial surfaces. Two thirds of the substance of the heart's walls were formed by a fatty substance of a dirty yellow colour.	Adhesions of both pleuræ. The spleen enlarged.

11.	M. Cruveilhier, Anat. Pathol., vol. i, Liv. iii, Planche i, 1827-36.	F	Aged	An aged inhabitant of the Salpetrière, presented for some years the signs of dilatation, with hypertrophy of the heart, and died suddenly.	Sudden, by cardiac apoplexy.	The substance of the heart paler than natural, and more fragile. A rupture of some fibres in the substance having taken place, spots of hemorrhage are seen constituting "cardiac apoplexy."	M. C. does not consider the change as fatty degeneration, but a physician in whose opinion he placed confidence, declared it to be so. M. C.'s objection to this is merely, that "as fat does not cause fragility of the heart, this could not be a fatty degeneration," an opinion which is contrary to facts.
12.	Idem, vol. ii.	F.	75	Died suddenly.	Rupture of the heart.	The L. V. hypertrophied. The tissue fragile and yellowish, as if infiltrated with pus. A perforation in L. V. at one inch from the apex. "M. Bergeon considered it a case of fatty degeneration."	The muscles of the calf fatty and very similar in appearance to the heart.
13.	Idem.	F	—	Had a fall three days before death, and was never well subsequently.	Rupture of the heart.	Hypertrophy of the L. V. Fragility and yellow discoloration at the seat of rupture, one inch from the apex in front. Fibrous deposits in posterior wall of L. V.	——
14.	Dr. Townsend, Dub. Journ., vol. i, 1832, p. 165.	F	90	An inmate of a workhouse, and in the enjoyment of good health. At 88, she fractured her thigh, but recovered. Died suddenly two years afterward whilst at chapel.	Rupture of the heart.	Heart loaded with fat. Substance pale, soft and flabby. A rupture rather larger on inner than on outer surface, through anterior wall of L. V., at one inch from the apex. Coronary arteries diminished in diameter by deposit.	——

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
15.	Idem, p. 166.	M.	84	An inmate of a workhouse, after a life of activity. Had good health, with the exception of occasional pain and uneasiness in the region of the heart. These attacked him severely one night; they were relieved in the morning. He died suddenly immediately after a meal.	Rupture of the heart.	Heart rather large. L. V. thickened. R. V. thinner than usual; loaded with fat. Substance pale, soft, flabby. Rupture in front of L. V. near the apex: one of the fleshy columns torn across and projecting into the rent. The coronary arteries were ossified even to their terminations.	——
16.	Dr. Stephens, Medico-Chirur. Rev., 1833, p. 670.	M.	61	Enjoyed good health, and was rather corpulent. He was accustomed to take exercise freely. Suddenly seized with acute pain across the sternum and down the arms. His pulse regular, 72, moderately full. Relief. Three relapses. Death in forty-eight hours from first seizure.	Rupture of the heart.	The base of the heart loaded with fat. The muscular substance resembled the liver; it was pale, soft, and broke beneath the touch. A rupture in front of L. V. toward the apex. The heart thinned here.	Body rather fat.
17.	Mr. Smith, Dub. Journ., vol. ix, 1838.	F.	90	Debility. Sudden death.	Rupture of the heart.	The heart covered with fat. The muscular substance of a pale yellow colour, as if infiltrated with pus, (Mr. Smith says it resembles exactly M. Cruveilhier's drawing,) flaccid. The knife was greased after cutting it.	The subcutaneous cellular tissue was loaded with soft fat. Liver very soft. Oil poured from the vena cava and the other divided vessels.
18.	Idem.	F.	70	No history, she was found in a dying state.	——	Surface of the heart covered with a layer of fat, quarter of an inch thick. Muscular substance soft, pale, and flaccid.	Oil floating on the surface of the blood.

19.	Dr. Hope, Diseases of the Heart, 1839, p. 343.	M. 69	Very fat; had for six or seven years intermittent pulse, and hurried breathing on exertion. Three years before death had jaundice. Fatty heart being suspected, too much exercise was taken, with the view of remedying it. He became worse, had palpitation, dyspnœa, and sleeplessness. Pulse weak, small, irregular. General languor of the circulation. Impulse of heart, a flutter and an occasional bound of greater force. Sound weaker than natural. Heart's contractions from 130 to 140; pulse 40 to 60. The symptoms became worse, and he died in a fortnight.	Gradual.	Heart greatly enlarged. Muscular substance hypertrophied, dark coloured, but very soft. External third of the wall of R. V. replaced by fat.	Pulmonary apoplexy.
20.	Idem, p. 351.	M. 50	Stout and fat. Three years before death had inflammation of the heart; and subsequently occasional oppression in this region, and pain down the left arm. He could mount ascents without difficulty. Pulse irregular. Impulse of heart unequal. Sounds both dull. He was bled, had liquor potassæ, and lived carefully. He got better. In eight months his liver became enlarged, he lost much flesh and died.	Gradual.	Heart enlarged, and much covered with fat. Muscular substance hypertrophied, but soft and flabby.	Liver not enlarged, but of the nutmeg character.
21.	Mr. Bedington, Provincial Med. & Surg. Journal, Nov. 1843.	M. 70	Had been complaining for a week or ten days. In the morning had a "stitch in the side," which became an intense pain in the chest during the day. This continued, and extended along the arms to the wrists. The pulse slow and feeble. Death on the same night.	Rupture of the heart.	The heart, of the usual size, was loaded with fat; the muscular substance softened from fatty degeneration, and thinner at the seat of rupture, viz. in front of L. V. There were two ruptures externally, and but one internally.	——

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
22.	Dr. Maclagan, Edin. Mon. Journal, 1845, p. 42.	F.	75	A lady, in good health, but unable to ascend heights, was seized with faintness. She then complained of uneasiness, tightness, and weight in the chest. Her surface was cold. She was almost pulseless. There was extended dullness, and feeble impulse in the region of the heart. She died in an hour.	Hemorrhage into pericardium.	Heart rather large, loaded with fat; the muscular substance soft, as from "chronic inflammation." There were two superficial lacerations on the outer surface of the heart, one of which communicated with a branch of the coronary vein.	——
23.	Dr. Andrews, Idem, p. 481	M.	60	A gentleman, in pretty good health, but unable from dyspnœa to use active exercise, was engaged for many hours during three successive days in preparing some official returns. After a short walk, he fell dead.	Sudden.	Heart enlarged to three times its natural size, and loaded with fat. The softness of the muscular substance of the right auricle, right ventricle, and upper two thirds of left ventricle, was such that, in handling, it was difficult to avoid lacerating it. The right auricle dilated, attenuated, and its fibres torn in three places; blood was extravasated amongst them. The pericardium alone prevented a complete rupture.	——
24.	Mr. Lavies.	F.	56	Of intemperate habits. After being received in prison, she was suddenly seized with illness, her breathing was oppressed, and her countenance livid. She died suddenly.	Rupture of the heart.	The heart preternaturally large. The muscular substance soft, and of a dirty-yellowish hue. Rupture (in L. V.?).	Body fat.
25.	Dr. Latham, Clinical Medicine, vol. ii, 1846, p. 149.	M.	70	Convivial, and in good health. After considerable exertion, he was seized with difficulty of breathing, and sense of sinking or fainting,—pulse frequent and feeble. Relief. The heart's impulse feeble, but felt over a large space. He died suddenly, on the eighth day.	Sudden.	Pericardium unusually vascular. The heart large. The muscular substance pale, flabby, and lacerable, which seemed to arise from its partial conversion into fat,—this tissue being mixed up with the fibres, particularly on the external surface. A commencing cardiac aneurism was found at the	A pint and a half of serum in each pleura. The liver twice the natural size. Atheromatous de-

					apex of L. V.,—it was the result of softening and attenuation of the heart's substance at that point,—the endocardium being destroyed.	posits in the aorta.
26.	Dr. Stokes, Dubl. Journ. vol. i, N. S. 1846, p. 491.	M. 50	Seemed to suffer more from want than disease. He experienced great distress from the least effort, and seemed to lie in a state of lethargy. The action of the heart, and both sounds, were feeble. He died without a struggle. Pulse small, and compressible.	Lethargic.	Pericardial surfaces adherent. Much fat about the heart. The muscular substance of L. V. flabby, degenerated, and its cavities dilated. The substance of R. V. atrophied. Much fat on its surface, and about the *origin of the chordæ tendineæ* (?).	——
27.	Mr. Harrison, Provincial Med. & Surg. Journal, 1848, p. 590.	M. 67	Moderately stout, but flabby. Always enjoyed good health. Complained, for a day or two, of pain and oppression in the præcordial region. Having been engaged all day in business fell dead. His features were pale.	Syncope.	The heart pale, soft, flaccid, of a dirty-yellow colour. It appeared a mass of fat. "A fatty transformation and infiltration of the muscular substance, it could be moulded like putty." The ventricular walls thin, L. V. dilated, auricles and large vessels gorged with blood. Coronary arteries normal.	All the viscera loaded with fat.
28.	Dr. Binney, Med. Gaz., vol. i, 1849.	M. 67	Lived abstemiously for twenty years, in consequence of suffering lumbar pains. Had an attack of pleurisy, and was found to be the subject of heart-disease when examined. He felt giddy, and complained of a sensation of sinking when riding, walking, or going up stairs, he also suffered from violent painful palpitations of the heart at night. After walking three miles, and getting wet in doing so, he was seized with pains in abdomen, sickness, and diarrhœa. The latter symptoms were relieved by next day; but he appeared excited, and his pupils were contracted:	Rupture of the heart.	Pericardium contained "two ounces and a half of bloody serum." Heart natural in size, covered with fat. Wall of right ventricle thinned, soft, and fatty. A small opening existed at the base, into the cavity of the right ventricle. The mitral valves were healthy—one of the aortic was ossified; the other studded with atheroma. The aorta dilated and similarly studded.	Adhesions of the left pleura. Granular disease of the kidneys. Congestion of the vessels of the brain. Four oz. of blood, mixed with serum, found in the arachnoid, when the brain was removed.

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
				during the night he was found comatose; breathing stertorously; and he died in about thirty-six hours from first.			
29.	Mr. Robbs, Med. Gaz., vol. ii, 1849.	M.	—	Was stated to have enjoyed an ordinary state of health. After eating dinner hurriedly, adjourned to a public-house, to procure some ale. Whilst in conversation, fell dead,—Mr. Robbs says, from "angina pectoris."	Syncope.	Pericardial surfaces firmly adherent. Much fat on the surface of the heart. Heart greatly hypertrophied. The auricles large, distended with blood; their walls flabby and soft. The walls of the ventricles thick, soft, easily broken, and greasy. The mitral valves thickened. Aortic valves fibro-cartilaginous.	Universal old adhesions of the pleural surfaces. The liver enlarged and granular.
30.	Dr. Henry Bennett.	F.	23	A lady, of lymphatic constitution, passed through her pregnancy in tolerably good health, only casually complaining of difficulty of breathing. Slight hemorrhage occurred, owing to a partial placental presentation, and returned to a slight extent after delivery. Chloroform in small quantity had been used. She rallied, but remained weak, her pulse being weak and small. On the 21st day she died instantaneously, without any evident cause.	Syncope.	The heart rather larger than natural. The cavities dilated. The muscular parietes were so soft, that they felt like a piece of wet wash-leather.	——
31.	Dr. H. Kennedy, Dublin Med. Press, vol. xxii, 1849, p.370.	M.	59	A clergyman, treated twice for gout and thrice for cynanche tonsillaris; subject for several years to attacks of syncope, in which he did not lose his consciousness, but "in which the feeling of death itself was strong upon him." Pulse slow (56); no intermission. Temperature of body low.	Sudden.	Heart larger than natural; "fatty." Valves healthy. Dr. Kennedy refers to the recent investigations on fatty degeneration.	Body fat. Vessels of brain congested.

32.	Idem.	M		A gentleman, a large eater, at 27, changed from an active to a sedentary life, and became very corpulent. Soon after (at 33), suffered from a "thickness in," or slight difficulty of, breathing; always worse on taking cold, or when dyspeptic. For the dyspepsia used carbonate of soda. After some time, seized with a fit. He was in a state of faintness or collapse; conscious; face pale; surface cold, particularly feet and legs. Pulse and heart's action extremely weak. Breathing oppressed. These fits recurred frequently for some years, when he died of diarrhœa.	Diarrhœa.	Heart larger than natural; more fat than usual on its surface. Its muscular substance pale and flabby.	—
33.	Mr. Woollaston.	F.	56	A lady, living luxuriously, taking little exercise, sallow complexion, fat, had suffered from indigestion, impaired health, pain in the region of the heart, short breath, and a distressing sense of faintness. Last three or four years of life there was slight paralysis of the left leg. She died suddenly.	Syncope, from hemorrhage into the pleura.	The heart small, and much fat about its vessels. The tissue pale and soft. Coronary artery ossified and cartilaginous, to the extent of an inch and a half. Atheromatous deposits on the aortic valves. The ventricles empty.	The omentum loaded with fat. The right lung dark coloured. The left lung gorged, the pleura containing much coagulated blood, which had escaped from a rupture of the tissue of the lung. Liver hard, granular. Kidneys pale, soft, and small.
34.	Catalogue, R. C. S. Museum, No. 1520.	F.		The patient was a lady, and the rupture produced sudden death.	Rupture of the heart.	A heart generally enlarged, invested by an unnatural quantity of fat. The muscular tissue is thin and pale. A rupture through anterior wall of L. V. at an inch from the base.	

No.	Record.	Sex.	Age.	Previous history.	[illegible]	State of the heart.	Remarks.
34 a.	Catalogue, R. C. S. Museum, No. 1521.	F.	68	Corpulent, sedentary for six years,—had suffered from dyspnœa. Five months before her death had a slight apoplectic fit, followed by permanent numbness of the left arm and legs, and increase of the dyspnœa. Pulse hard, small, intermittent. The least acceleration of the heart's action producing a state like syncope. Sixteen hours before death was awakened by a violent pain in the region of the heart. She was relieved by a small bleeding, but continued restless and died suddenly.	Rupt[illegible] the heart.	The muscular substance pale and flaccid, and nearly covered by a thick layer of soft fat. Earthy deposits in coronary arteries, by which the left is obliterated. A rupture in front of left ventricle about two inches from the apex.	This case is presumed to be the same as that already recorded, No. 2, in this Series. The specimen is from Mr. Langstaff's collection; and Mr. Hodgson's case, of which the details are nearly the same, was obtained from Mr. Langstaff. The results, therefore, are not included in the abstract made from these histories. It is given with a view of showing the nature of the cases which appear to have been overlooked when this was first recorded.
35.	Idem, No. 1522.	M.	47	A robust plethoric man. Inflammation of the heart occurred during an attack of acute rheumatism of the hands and feet, and he died suddenly on the fourth day.	Rupture of the heart.	The heart was natural in size—there were no signs of old organic disease, but indications were found of recent endo- and pericarditis. The heart was thickly invested with fat, and the muscular substance thin towards the apex of R. V., through which two small ruptures have occurred.	Degeneration appears well marked.

Series III.—*Containing the abbreviated histories of Fifteen cases of Excessive Accumulation of Fat on the surface of the Heart.*

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death	State of the heart.	Remarks
1.	Lancisi, De Subit Mort. 1707, p. 176.	M.	50	A very corpulent man, addicted to indulgence at table, suffered from pain at the base of the chest, and difficulty of breathing. His pulse irregular. Being seized with an irritating eruption of the skin, he exposed himself to cold, and died suddenly.	"Apoplexia syncopalea."	Everywhere loaded with fat.	The body fat. The brain congested. The liver a little enlarged. The gall bladder also called. Lancisi ascribes the death to "consequi apoplexy."
2.	Schreffer, Nov. Act. Acad. Nat. Curios. 1761, p. 108	M.	30	Having little occupation, gave himself up to enjoyment, and became so fat as to be unable to move without distress.	Sudden.	Pericardium contained some clear serum. Heart loaded with fat.	The body every where loaded with fat. The liver enlarged.
3.	Morgagni, De Sedibus, &c. Epist. iii, 1765, Obs. 20.	M.	Aged	Died after an apoplectic seizure of some days' duration. Little previous history.	By some local hemorrhage.	Heart so covered with fat, that none of its muscular substance could be seen.	Body and fat. Clot floating in the left ventricle. Hemorrhage in the brain.
4.	Idem. Epist. xxvii, Obs. 2.	F.	75	Had been subject, for some months, to vertigo, frequent swoonings, breathing stertorous. Sudden death.	Rupture of the heart.	The heart was loaded with fat. The muscular substance thin beneath it. A rupture at the back of the left ventricle, near the apex. A ring of bone surrounded the left aortic vent. opening.	The body generally contained much fat. The aorta was much ossified.
5.	Idem, Epist. xxxv. Obs. 18.	F.	54	"A great princess" suffered from severe pain in the abdomen, and diarrhœa. After each two laudable strokes of the pulse, followed two low, and of unequal celerity.	By gangrene of the intestines.	Pericardium and heart overloaded with fat.	The abdomen fat. not much fat on the limbs.

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
34 a.	Catalogue, R. C. S. Museum, No. 1521.	F.	68	Corpulent, sedentary for six years,—had suffered from dyspnœa. Five months before her death had a slight apoplectic fit, followed by permanent numbness of the left arm and legs, and increase of the dyspnœa. Pulse hard, small, intermittent. The least acceleration of the heart's action producing a state like syncope. Sixteen hours before death was awakened by a violent pain in the region of the heart. She was relieved by a small bleeding, but continued restless and died suddenly.	Rupture of the heart.	The muscular substance pale and flaccid, and nearly covered by a thick layer of soft fat. Earthy deposits in coronary arteries, by which the left is obliterated. A rupture in front of left ventricle about two inches from the apex.	This case is presumed to be the same as that already recorded, No. 2, in this Series. The specimen is from Mr. Langstaff's collection; and Mr. Hodgson's case, of which the details are nearly the same, was obtained from Mr. Langstaff. The results, therefore, are not included in the abstract made from these histories. It is given with a view of showing the nature of the cases which appear to have been overlooked when this was first recorded.
35.	Idem, No. 1522.	M.	47	A robust plethoric man. Inflammation of the heart occurred during an attack of acute rheumatism of the hands and feet, and he died suddenly on the fourth day.	Rupture of the heart.	The heart was natural in size—there were no signs of old organic disease, but indications were found of recent endo-and pericarditis. The heart was thickly invested with fat, and the muscular substance thin towards the apex of R. V., through which two small ruptures have occurred.	Degeneration appears well marked.

SERIES III.—*Containing the abbreviated histories of Fifteen cases of Excessive Accumulation of Fat on the surface of the Heart.*

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
1.	Lancisi, De Subit Mort. 1707, p. 176.	M.	50	A very corpulent man, addicted to indulgence at table,—suffered from pain at the base of the chest, and difficulty of breathing. His pulse irregular. Being seized with an irritating eruption of the skin, he exposed himself to cold, and died suddenly.	"Apoplexia syncopales."	Everywhere loaded with fat.	The body fat. The brain congested. The liver a little enlarged. The gall-bladder ulcerated. Lancisi ascribes the death to "syncopal apoplexy."
2.	Schœffer, Nov. Act. Acad. Nat. Curios. 1761, p. 108.	M.	30	Having little occupation, gave himself up to enjoyment, and became so fat as to be unable to move without distress.	Sudden.	Pericardium contained some clear serum. Heart loaded with fat.	The body everywhere loaded with fat. The liver enlarged.
3.	Morgagni, De Sedibus, &c. Epist. iii, 1765, Obs. 20.	M.	Aged.	Died after an apoplectic seizure of some days' duration. Little previous history.	By cerebral hemorrhage.	Heart so covered with fat, that none of its muscular substance could be seen.	Body not fat. Ossification of the falx cerebri. Hemorrhage in the brain.
4.	Idem, Epist. xxvii, Obs. 2.	F.	75	Had been subject, for some months, to vertigo, — frequent swoonings. Breathing stertorous. Sudden death.	Rupture of the heart.	The heart was loaded with fat. The muscular substance thin beneath it. A rupture at the back of the left ventricle, near the apex. A ring of bone surrounded the left auric. vent. opening.	The body generally contained much fat. The aorta was much ossified.
5.	Idem, Epist. xxxv. Obs. 18.	F.	54	"A great princess" suffered from severe pain in the abdomen, and diarrhœa. After each two laudable strokes of the pulse, followed two low, and of unequal celerity.	By gangrene of the intestines.	Pericardium and heart overloaded with fat.	The abdomen fat—not much fat on the limbs.

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
6.	Lieutaud, Hist. Anat. Medica, vol. ii, 1767, p. 19.	M.	50	A very fat man — suffered from difficulty of breathing and sleepless nights, being unable to lie down.	Sudden. Syncope?	Heart large, loaded with fat.	The lungs small.
7.	Dr. Fothergill, Medical Observations, &c. vol. v, 1776.	M.	58	Regular in habits — disposed to corpulency. Subject to giddiness, then to pain and tightness in the chest, aggravated by exercise. Pulse irregular. Breathing difficult, especially after exercise. A well-marked case of angina pectoris.	Sudden, in a paroxysm.	Much fat beneath the pericardium. White spots on the apex, resembling a cicatrix.	Fluid in both pleuræ. Much fat in abdomen.
8.	Portal, Mémoires de l'Acad. des Sciences, 1784.	F.	Not stated.	Had been subject to difficulty of breathing. After a journey she was seized with colicky pains, and her breathing became more difficult. The same night she called aloud for aid, and died.	Rupture of the heart.	The heart covered with a thick layer of fat. The muscular substance said not to have been softened. Rupture at the base near the aorta.	The body enormously fat. The muscles were penetrated with this tissue.
9.	Dr. Wall, Trans. of Coll. of Physicians, vol. iii, 1785, p. 12.	M.	66	Inclined to corpulency. Had been subject to rheumatism. For two or three years felt a pain, or tightness across the chest, on walking fast: this increased, and the slightest exertion caused dyspnœa. He was slightly relieved by bleeding. Towards the end had a cough. Pulse not irregular, but small. He died in a fit.	Sudden. A fit of two hours' duration.	The heart, of uncommon size, was covered with a great quantity of fat. There was fluid in the pericardium. The semilunar valves were ossified.	Fluid in the pleura. The lungs firm. Aorta enlarged, and ossified.
10.	Dr. Parry, On Syncope Anginosa, 1799, p. 7.	M.	56	Robust and corpulent; of irregular but sedentary habits; suffered from symptoms of angina pectoris—sense of stricture in the chest, pain, diffi-	Sudden.	Abundance of fat on the pericardium and heart. The coronary arteries thickened, cartilaginous, and filled to their extremities with a sub-	Liver pale. Other viscera covered with fat. Two quarts of coloured serum in the pleura.

				culty of breathing, irregular pulse, &c. He continued subject to these paroxysms for a year, when they became more severe, and he died very suddenly, in a fortnight from this time. The pain had ceased some time before his death.		stance like the lymph of croup. No blood in the cavities of the heart.	
11.	Idem, p. 14.	M.	63	Inclined to corpulency; a hearty eater, but temperate in drinking. Accustomed to take much exercise out of doors, until, by an accident, he was obliged to remain in-doors, and to exercise with weights. He became more corpulent, and restless at night. Seven years before his death, he had slight symptoms of angina pectoris, with a cough; they disappeared, but returned in eighteen months. He then had a return of the pain, and afterwards a fit of syncope. Pulse not to be felt, but, on recovering, it was irregular, and he complained of a dull pain from the mamma to the sternum. *No other affection.* He died the same night, in an attack nearly similar.	Sudden.	The heart large, and loaded with fat. The cavities full of blood. The coronary arteries extensively ossified.	The integuments fat. No fluid in the pleura. The lungs sound. The aorta dilated. 2654 small gall-stones in the gall-bladder.
12.	Idem, p. 20.	M.	77	Moderately fat, of sedentary and temperate habits. During a residence in India was attacked with slight symptoms of angina pectoris, and was liable to pains, attacking successively the head, chest, limbs, &c., with cramps in the legs. He was not subject to any distress of breathing, or to	After several attacks of angina pectoris.	The heart was buried in fat, and of a moderately firm texture. The blood was fluid, and flowed out when the vessels were cut across. Considerable ossification of the coronary arteries.	The lungs healthy. No effusion. Aorta dilated.

No.	Record.	Sex.	Age.	Previous history.	Cause or mode of death.	State of the heart.	Remarks.
				palpitation. He was suddenly seized with a sense of suffocation, and pain in the chest. In about twelve months this returned, and he had several attacks, as of syncope, with pain, and died.			
13.	Dr. Francis, Guy's Hospital Reports, vol. iii, 1838.	M.	71	Subject to a chronic cough. Whilst walking one day quickly across a workhouse yard, after eating a hearty supper, he lost his breath, seized some railings, glided to the ground, and was dead in a few moments.	Sudden.	Heart covered with fat, which also surrounded the pericardium and great vessels. The right side was loaded with blood,—the left side empty.	The lungs were emphysematous.
14.	Dr. Stroud, Med. Gazette, vol. xxvi, 1840.	M.	29	Suffered from mental distress, and, on the cessation of an habitual nasal hemorrhage, had slight cerebral symptoms,—was seized with giddiness, vomiting, insensibility. Pulse imperceptible. He was bled freely, and, having rallied a little, complained of weight and tightness in the region of the heart. Died same night.	By rupture.	Heart large, loaded with fat,—an opening through the wall of the right auricle, just below the insertion of the vena cava. Substance not ulcerated nor thinned.	——
15.	Dr. Latham, Clinical Medicine, vol. ii, 1846, p. 387.	M.	55	Returned from India with unimpaired health, but with a tendency to fatness. After exercise, whilst in his usual health, felt pain (after dinner) in the region of the heart. The pain got better, but he was found dead in a few hours afterwards.	Sudden.	Muscular substance thin, and encroached on by fat.	——

GENERAL ABSTRACT, *showing the principal facts in the histories of Eighty-three cases of Fatty Disease of the Heart,—contained in the Three preceding Series.*[1]

Clinical History.		Ser. I.	Ser. II.	Ser. III.	Total.
Number of cases	Males	24	19	12	55
	Females	9	16	3	28
Ages.					
Under 20	Males	0	0	0	0
	Females	1	0	0	1
20 to 30	Males	1	0	1	2
	Females	3	3	0	6
30 „ 40	Males	2	0	0	2
	Females	2	0	0	2
40 „ 50	Males	4	1	0	5
	Females	4	0	0	4
50 „ 60	Males	1	4	6	11
	Females	0	2	1	3
60 „ 70	Males	5	8	2	15
	Females	2	1	0	3
70 „ 80	Males	5	1	2	8
	Females	0	5	1	6
80 „ 90	Males	2	1	0	3
	Females	0	2	0	2
"Aged"	Males	1	0	0	1
	Females	0	2	1	3
Not stated	Males	0	3	0	3
	Females	0	2	1	3
All	Both sexes	33	35	15	83
Class in Society.[2]					
Higher	Males	7	8	5	20
	Females	2	6	2	10
Middle	Males	6	7	5	18
	Females	2	2	1	5
Lower	Males	11	4	2	17
	Females	5	8	0	13
Conformation.					
Fat persons		12	11	11	34
Thin ditto		9	0	1	10

[1] The cases from which this Abstract is taken, being recorded by a number of different observers who had no special views to illustrate, possess the advantage of presenting the more striking phenomena of each case so far as they were ascertained, but fail in affording all the positive and negative information which would be valuable in completing the details.

[2] Inferences as to the habits of living, may be derived from knowing the station in life. They are positively stated in too few instances to deserve attention here.

Clinical History.	Ser. I.	Ser. II.	Ser. III.	Total.
Habits.[1]				
Active	2	0	0	2
Sedentary	14	5	3	22
Symptoms.[2]				
Giddiness	3	2	3	8
Fits of coma	2	5	2	9
Syncope	8	7	8	23
Short breath	17	16	9	42
Pain, long continued	7	7	5	19
„ a short time before death	5	7	1	13
„ intermittent	8	4	5	17
„ local	8	8	6	22
„ extended to the arms	4	4	4	12
Physical signs.				
Pulse weak	5	9	2	16
„ strong	0	0	0	0
„ slow	4	4	0	8
„ quick	0	3	0	3
„ regular	1	3	1	5
„ irregular	7	6	4	17
Impulse of the heart, weak	5	5	0	10
„ „ strong	2	0	0	2
„ „ extended	5	2	0	7
Extended dullness	5	1	0	6
First sound, feeble	4	2	0	6
Second sound, ditto	3	2	0	5
Murmur,[3] first sound	4	0	0	4
„ second sound	1	0	0	1
Mode of death.[4]				
Sudden	28	26	14	68
Prolonged	4	8	1	13
By syncope[5]	13	8	5	26
By coma	4	2	1	7
By rupture of the heart	8	17	3	28
By other diseases	7	3	1	11
Not stated	1	5	5	11

[1] Four individuals, in SERIES I, were always sedentary. Ten became sedentary after a life of activity. In SERIES II, four out of the five became sedentary after an active life.

[2] Two individuals are stated, in SERIES I, to have been in good health up to the moment of the fatal seizure. In two other cases, the previous state of health was not clearly ascertained. In SERIES II, six are stated to have been in good health.

[3] In one case, nothing to explain the source of the murmur is recorded.

[4] The mode of death is not stated in one case in SERIES I, and not in another in SERIES II.

[5] Five other individuals, in SERIES III, appear to have died by syncope, but as it is not clearly stated, they are not included here.

Morbid Appearances.	Ser. I.	Ser. II.	Ser. III.	Total.
State of the heart.				
Size[1] increased	23	16	4	43
„ diminished	1	3	0	4
Consistence diminished[2]	19	32	0	51
Tissue discoloured[3]	20	32	0	52
Fatty growth on the heart more than usual	21	22	15	58
„ „ less than usual[4]	4	0	0	4
Degeneration, both ventricles	10	8	0	18
„ right ventricle	4	1[5]	0	5
„ left ventricle	8	0	0	8
Coronary arteries ossified or obstructed[6]	13	7	5	25
Valvular disease, chronic, endo, or pericarditis	6	11	0	17
Liver.[7]				
Large	8	4	0	12
Fatty or soft	5	1	0	6
Granular, small or mottled	5	5	0	10
Jaundice	1	1	0	2
Gall-stones	1	1	2	4
Ulceration of gall-bladder	1	0	1	2
Kidneys.[8]				
Large	5	0	2	7
Fatty	2	0	0	2
Granular, mottled, &c.	6	2	1	9
Spleen.				
Enlarged, or deposits in	1	1	0	2

[1] The volume was not changed in five cases of SERIES I, and not in three of SERIES II.

[2] In three cases of SERIES II, the tissue is described as being fragile.

[3] In one case, in SERIES I, the pale buff colour was limited to a portion towards the apex of the left ventricle; in one case, in SERIES II, the tissue is described as being dark coloured.

[4] In the other cases, the quantity of fat is not stated, or is said to be usual.

[5] The extent of the degeneration is too indefinitely mentioned in the other cases to justify its limitation.

[6] Healthy in one. Not examined in several of SERIES I. Healthy in two of SERIES II.

[7] The liver was diseased, in one form or other, in fifteen cases of SERIES I; and in eight of those in SERIES II.

[8] The kidneys were diseased in eight cases in SERIES I; in one case said to be healthy.

The chief diseased conditions not already mentioned here, which coexisted with that of the heart, and in some cases caused death.	Ser. I.	Ser. II.	Ser. III.	Total.
Death by apoplexy	1	1	1	3
Serous effusion on brain	3	2	0	5
Mental irritability	3	0	0	3
Paralysis	2	2	0	4
Nasal hemorrhage	0	0	1	1
Aorta, diseased, or aneurism	4	1	3	8
Bronchitis	2	0	1	3
Emphysema	2	0	1	3
Pneumonia (chronic)	1	1	0	2
Pleuro-pneumonia	1	0	0	1
Pleuritic adhesions	0	5	0	5
Inhalation of chloroform[1]	1	0	0	1
Old tubercles	2	0	0	2
Phthisis	1	0	0	1
Hæmoptysis	0	1	0	1
Pulmonary congestion, or apoplexy	0	2	0	2
Cancrum oris	1	0	0	1
Stricture of œsophagus	1	0	0	1
Indigestion	2	1	0	3
Peritonitis	1	0	0	1
Hæmaturia	1	0	0	1
Renal calculus	1	0	0	1
Diseased prostate	3	0	0	3
After delivery	2	0	0	2
Anasarca	4	4	0	8
Gout	1	1	0	2
Rheumatism	2	2	1	5
Petechiæ	1	0	0	1
Prostration or debility	2	3	0	5
Muscles of the body, fatty	0	2	1	3

[1] Some doubt has been expressed by Dr. Snow, as to whether the death in this instance (Case 22, Series I) was due to the chloroform, or to a mental impression acting on a weak heart. (See Medical Gazette, 1848.)

Whilst these pages are passing through the press, a similar event has occurred at Guy's Hospital. A man, 35 years of age, having been narcotised by chloroform, died suddenly whilst undergoing an operation on the hand. After death, marks of cupping were noticed over the heart. This organ was found "feeble and flabby," and having much more fat than usual on the surface. (Lancet, July 6th, 1850.) These cases, whether the deaths were caused by the chloroform, by the mental impression, or by the shock of the operation, equally suggest the importance of ascertaining the state of the heart before such influences are suffered to come into operation.

A CASE OF GUNSHOT WOUND,

AND SUBSEQUENT

EXTRACTION OF A BULLET FROM THE BLADDER.

BY

E. M. MACPHERSON,

ASSISTANT SURGEON TO THE NINTH ROYAL LANCERS.

COMMUNICATED, WITH NOTICES OF SIMILAR CASES, BY

JAMES DIXON,

ASSISTANT SURGEON TO ST. THOMAS'S HOSPITAL.

Received February 4th.—Read March 26th, 1850.

At the battle of Chillianwallah (January 13th, 1849), private West, of H. M. 24th Regiment, was shot in the left buttock, about the situation of the ischiatic notch, but he immediately felt such severe pain in the left testicle, as made him at first suppose that part to be the seat of injury.

Although the ball could not be found, the wound healed without any difficulty, and no blood was ever noticed either in the stools or urine. Shortly after the infliction of the wound, a discharge from the urethra made its appearance, accompanied with some pain in passing water. At first, little attention was paid to these symptoms, as they were supposed to be the remains of a gonorrhœa which the patient had suffered from four months previously.

As, however, the discharge did not yield to remedies, and much ropy mucus was secreted, the presence of a foreign body in the bladder was suspected, and a sound having been introduced, a hard substance was distinctly felt, and heard to ring against the instrument.

The lateral operation, as if for the removal of a calculus, was determined on, which I performed, on the 30th of August, 1849; a common dissecting scalpel being the only cutting instrument employed. An iron ball was extracted from the bladder, weighing one ounce and thirty-eight grains: it had become encrusted with a very thin layer of sandy deposit; so slight, indeed, as to be hardly appreciable. By the end of October the patient was convalescent.

Situation of wound.	Ball extracted by operation.	How long after wound.	Operator.	Result of operation.	Ball found after death.	How long after wound.	Report of case.
In hypogastrium.	Calculus surrounding it; size of a pigeon's egg.	Five years.	Pellotier.	Successful.	. . . .	. . . .	Covillard. Observations Iatrochirurgiques, 2d edit., by Thomassin; 1791.
In hypogastrium.	. . . . .	Four or five years.	Frère Jacques.	. . . . .	. . . .	. . . .	Dionis. Cours d'Opérations, 1708, p. 170.
Upper and back part of thigh.	Calculus surrounding it.	Four or five months.	Ridoute.	. . . . .	. . . .	. . . .	Cheselden. Treatise on the High Operation, 1723, Plate 10.
In hypogastrium.	. . . . .	Several years.	Morand, sen.	. . . . .	. . . .	. . .	Morand.[1] Traité de la Taille au Haut Appareil, 1728, p. 224.
Over ilium.	Calculus surrounding it.	Ten years.	Maréchal.	. . . . .	. . . .	. . .	Garengeot. Traité des Opérations, 2d edit., 1731, (not in 1st edit.)
At bottom of linea alba.	. . . . .	. . . .	Duvergé.	Successful.	. . . .	. .	Percy. Manuel des Chirurgiens d'Armée, 1792, p. 246.
Through sacrum and rectum.	Calculus surrounding it; size of a small hen's egg.	Ten years.	Langenbeck.	. . . . .	. . . .	. .	Larrey. Clinique Chirurgicale, 1829-36, vol. ii, p. 529.
In right groin.	. . . . .	Four days.	Larrey.	Successful.	. . . .	. .	Larrey. Op. cit.
Over false ribs on right side.	Ball weighed 4 oz. 2 gros.; had earthy deposit on it.	Eight years.	Souberbielle.	Successful.	. . . .	. .	Larrey. Op. cit., vol. ii, p. 535; and Bull. de la Société Médicale d'Emulation, 1821, p. 450.
Over tenth rib on left side.	Ball lodged in cyst, at upper and fore part of bladder.	Six years.	Larrey.	Successful.	. . . .	.	Larrey. Op. cit., vol. ii, p. 537.

Above the pubes.	Ball coated with phosphates.	Three months.	Guthrie.	Successful.	. . . .	. . . .	Guthrie. Lectures on Wounds and Injuries of the Abdomen and Pelvis, 1847.
An inch above right sciatic notch.	Fragment of bone adhering to it.	Seven months.	Cline.	Successful.	. . . .	. . . .	Chelius's System of Surgery, Note by South, vol. i, p. 482.
. . . . .	. . . . .	Six or seven months.	Colles.	Successful.	. . . .	. . . .	[2]
Through sacrum.	Ball found at left side of prostate.	About eighteen months.	Cusack.	Successful.	. . . .	. . . .	[3]
Above pubes.	High operation.	. . . .	Baudens.	Successful.	. . . .	. . . .	Baudens. Clinique des Plaies d'Armes à feu, 1836, p. 384.
At right side of coccyx, with fracture of that bone.	. . . . .	. . . .	. . . .	Extraction tried unsuccessfully; patient died in consequence.	Calculus surrounding it; size of hen's egg.	Thirty years.	Fabricius Hildanus. Opera Omnia, Francof. 1646, Obs. 67, p. 250. (Case communicated by Paulus Offredus.)
. . . . .	. . . . .	. . . .	. . . .	Same result as above.	Calculus surrounding it; size of egg.	. . . .	J. N. Binningerus. Obs. et Curat. Medicinal., Cent. v; Montbelgardi, 1673, p. 401.
. . . . .	. . . . .	. . . .	. . . .	Same result as above.	Calculus surrounding it; size of egg.	Twenty years.	T. Bartholini Epistolar. Medicinalium Cent. iii; Hagæ Com., 1740, epist. 35. G. Segerus to Bartholinus.

[1] Apparently the same case alluded to by Morand in his 'Hist. de l'Académie des Sciences,' An. 1725, p. 22; and in his 'Opuscules de Chirurgie,' 2de partie, 1772, p. 248.

[2] The patient was the "staff-surgeon" mentioned by Ballingall in his 'Outlines of Military Surgery,' 1838, p. 310. It is probably this operation which is attributed to Crampton by Guthrie. (Op. cit.)

[3] This is the case alluded to by Ballingall as previously operated on, without success, by another surgeon. (Op. cit., pp. 310-11.)

[The blanks in the above Table denote that particulars have not been stated by the authors.]

NOTE BY MR. DIXON.

[Several instances of bullets having been found within the cavity of the bladder are recorded, but I need hardly add that they are among the rarities of surgery. I can find the particulars of only fifteen operations for the extraction of balls which had either primarily entered the bladder, or, having lodged in the immediate neighbourhood, had afterwards made their way into its cavity by abscess and ulceration. Such cases are related by Covillard, Dionis, Cheselden, Morand, Garengeot, Percy, Larrey, South, Guthrie, and Baudens; and I owe to the kindness of Mr. Cusack a notice of an operation performed by him, and of another by the late Mr. Colles, neither of which has been published.

Extraction was either not attempted, or was unsuccessfully tried, in the cases reported by Fabricius Hildanus, Binninger, and Seger: the bullets, forming nuclei of stones, having been found in the bladder after death. In the case mentioned by Elsholz,[1] the bullet was small enough to be voided by the urethra.

As these histories are scattered among a variety of works, some of which are rare, I have arranged in a tabular form the chief points of interest they present.—J. D.]

[1] Ephemerides Naturæ Curiosorum, &c., Ann. ix, x, Obs. 85; copied by Bonnet into his Medicina Septentrionalis, vol. i, p. 831.

AN ACCOUNT OF

A CASE OF SCROFULOUS ABSCESS

OF THE

ANTERIOR MEDIASTINUM,

COMMUNICATING WITH BOTH SIDES OF THE CHEST, THE PERICARDIUM, AND TRACHEA; FORMING A TUMOUR ABOVE THE CLAVICLE, AND SIMULATING ANEURISM OF THE INOMINATA ARTERY OR ARCH OF THE AORTA.

WITH OBSERVATIONS.

BY

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Received February 3d.—Read April 9th, 1850.

JOHN COOPER, æt. 61, a thick-set, actively-formed man, formerly belonging to the 7th Hussars, became an in-pensioner of Chelsea Hospital on the 1st January, 1849, and was admitted into the infirmary on the 5th of the month, complaining of great difficulty of breathing, general debility, and constant pain in the back of the head, right shoulder, and arm.

Immediately above the sternal end of the right clavicle, and dipping underneath this bone, there was a slightly moveable, somewhat flattened tumour, of the size of a tennis ball, divided through the centre by a superficial sulcus, the integuments covering the inner half of which were slightly reddened. At this place a knuckle-like projection existed. The tumour was tense and elastic, except where it seemed to point: here an obscure feeling of fluctuation was perceptible; it was free from pain, and neither bruit nor pulsation could be detected in it. The carotid on this side beat feebly, and the pulse at the temple and wrist was scarcely discernible. Deglutition was difficult. The voice was husky,—he spoke

in a whisper. Respiration, at all times impeded, occasionally assumed an asthmatic character. He could not lie down. A teasing, dry cough, incessantly harassed him. The face and scalp were congested, the external jugulars and cutaneous veins prominent, and the lips livid. He was seldom free from pain in the back of the head, pain in the right shoulder, with pain and numbness extending from the clavicle down to the ring and middle fingers of this hand. It was evident that the trachea and œsophagus were pressed upon, and that the nerves and blood-vessels of the right side of the neck, and right upper extremity, suffered alike compression. The arm was not œdematous. A swelling, supposed to be an enlarged gland, existed below the angle of the lower jaw on the right side. The man's general health was greatly impaired; he was much emaciated, and the pulse was weak and rapid.

The account he gave of his illness was very obscure. In April preceding, when employed as a labourer, he caught a slight cold in his chest, since which he had never been entirely without some cough and difficulty of breathing, uneasiness in the chest, pain in the shoulder, and headache. Though unable to work since the commencement of his illness, at no time had he been forced to take to his bed. All his symptoms had greatly increased of late, and he had not derived any benefit from the medicines prescribed at a dispensary which he had regularly attended until within a short time of his becoming an inmate of Chelsea Hospital. His impression was distinct, that the tumour above described suddenly appeared after a violent fit of coughing, three weeks before his admission into the infirmary, on the 5th January. It was, when first observed, not larger than a nutmeg, and giving him no pain, it had scarcely received any attention. He had never experienced pain in any part of the chest equal to what he suffered in his head and shoulder.

The whole of the right side of the chest, anteriorly and posteriorly, was unequivocally dull on percussion. The sternum universally elicited a dull sound. Some fulness existed in the right infra-clavian region. The intercostal

spaces on this side were not prominent, nor different from those of the opposite side, nor was there any enlargement; but the costal movements of the two sides strongly contrasted. While they were absent on the right side, they were unusually vigorous on the left, corresponding entirely with the auscultatory signs. Respiration was clear and puerile, over the whole of the left side of the chest, with the exception of the præcordial region. It was entirely absent in the right side anteriorly. Along the spine, and at the base of the scapula on this side, a feeble respiratory murmur, with occasional mucous râles, could be heard; vocal and tussive fremitus was absent. The hand applied to both sides of the chest discovered moderate vibration on the left side; none could be felt on the opposite side. Altogether, the physical signs pointed to extensive effusion into the right cavity of the chest, and yet there were circumstances rendering a positive declaration of this hazardous.

The præcordial region was extensively dull on percussion. There was no perceptible impulse of the heart, and at no period were its sounds audible, however carefully the patient was examined. Latterly, the erect posture, or any sudden muscular effort, occasioned faintness. As already observed, the pulse was frequent and compressible, and a remarkable difference existed between the pulse of the right and left side, it being almost imperceptible in the radial and temporal arteries of the right side.

No alteration took place in the physical signs. Rather suddenly, about three weeks after admission, the respiration became more embarrassed, and the asthmatic paroxysms more frequent and severe. The difficulty of swallowing also increased. His voice was now almost indistinct. The cough continued all but dry. Occasionally, the very scanty catarrhal expectoration that he rejected became mixed with florid blood, and, about ten days before death, the sputa were purulent but still scanty. The tumour remained nearly stationary. Some fulness was perceived on the 28th January, along the lower part of the right side of the neck, extending backwards, towards the vertebræ, without possessing any

sense of fluctuation. Neither in this swelling, nor in the circumscribed tumour itself, was there ever any impulse communicated on coughing. Two days afterwards, on the 30th, an exploring needle was introduced into the most prominent part of the tumour, and pus being discovered, a small opening was made into it, when nearly three ounces of curdy sero-purulent matter escaped, the walls of the abscess collapsing and the tumefaction towards the spine partially subsiding.

From this date, the patient rapidly sank. On the day after the operation his breathing was more free. Each fit of coughing was now accompanied with a jet or gush of sero-purulent fluid from the opening, and the quantity discharged during the day in this manner was very considerable, saturating constantly renewed pledgets of tow. The exhaustion prevented a satisfactory physical exploration. On the 2d February, the right side of the chest, from the clavicle down to the nipple, had regained its lost sonoriety in a remarkable degree, and the respiration in the apex of this lung was now puerile. The dullness and absence of the respiratory murmur lower down remained as heretofore. Posteriorly the chest was not examined. No change was perceived in the sternum, nor in the region of the heart. The respiration in the left lung had diminished in intensity, acquiring, with the partial relief to the right lung, a more normal character. Death happened on the 7th of the month.

Post-mortem.—On raising the sternum the nature of the disease became immediately apparent. The whole of the anterior mediastinum was enormously thickened, the free surface highly vascular, and between its laminæ, in the substance of this diseased mass of hypertrophied cellular and adipose membrane, there was an almost-empty abscess, capable of holding a billiard ball. This cyst communicated by several fistulous openings with the right side of the chest, and with the pericardium by a very distinct-ulcerated perforation, admitting the little finger, situated near the right auricle. It also communicated, by one or two openings,

with the tumour or abscess in the neck. On slitting open the trachea, its internal surface was found highly vascular, as was the mucous membrane lining the first divisions of the bronchi. Midway between the larynx and bifurcation of the trachea, on the anterior and internal aspect, three or four warty granulations, of the size of a split-pea, were observed, apparently the termination of fistulous openings, through the lowermost of which a common probe could be passed into the diseased mass. The larynx itself was perfectly healthy. The innominata, and a considerable portion of the sub-clavian, were imbedded in the indurated structures. The sternum, vertebræ, and clavicle were sound. In the right pleural sac there were several pints of curdy sero-purulent fluid. This lung was pressed against the spine, sodden and splenified. The pleura covering it, and lining the ribs, was perhaps paler than usual, certainly free from any sign of recent inflammation. About a pint of precisely similar fluid lay in the left side of the chest. The pleuræ pulmonalis et costalis of this side were also healthy. Both lungs were studded with miliary tubercles. The pericardium contained about eight ounces of pus, of the same nature as existed in the abscess and sides of the chest. This sac, like the pleural cavities, was free from vascularity. The heart was sodden, but healthy.

The viscera of the abdomen were in a normal state. As was suspected, the sub-maxillary swelling was an enlarged scrofulous gland.

I have ventured to lay this case before the Society on account of the many points of interest it suggests for the consideration of the physician, the surgeon, and morbid anatomists, as well as on account of the comparative rarity of the disease.

Nine or ten months had elapsed before the patient came under observation at Chelsea Hospital, consequently the previous history of the case is involved in much uncertainty; but, from the man's statement, the disease seems to have commenced, like scrofulous abscess in general, slowly and

insidiously. It is probable, that the abscess had attained some bulk before the pectoral symptoms, to which he alluded as having attacked him in April, had been observed, and that these, consisting of cough and shortness of breathing, were the result of the growth of the mediastinal enlargement. Pain does not seem to have been a prominent feature until the abscess had compressed or involved the nerves and blood-vessels in its vicinity, and then it was remote from the sternum, affecting particularly the shoulder and sinciput. The pain in the chest was more a sense of oppression, and when closely questioned, the sternum was not pointed to as being, or having been, the site of any particular distress. In these respects, the symptoms differed, as would be expected, from what has usually been observed in acute mediastinal pleurisy, ending in suppuration, where, as in a case recorded by Andral, (*Clinique Médicale*, by Spillan, p. 581,) there was acute pain between the left breast and sternum, so very acute, as to render percussion impossible, increased by coughing and inspiration, and accompanied with high fever, intense anxiety, and ultimately, on the eighth day, with signs of effusion into the pericardium. These cases, however, are in reality examples of acute phlegmonous suppurative inflammation of the loose cellular membrane and adipose tissue enveloped in the laminæ of the pleura, forming the mediastinum, and not cases of circumscribed or partial pleurisy; and the symptoms must vary with the intensity of the inflammation, and the extent of the textures engaged. Scrofulous disease of the mediastinum may thus advance considerably before exciting attention, and when suppuration is established, pressure on the neighbouring organs will probably be the earliest indication of its formation, while it must be very liable to be confounded with other intra-thoracic growths, either of the mediastinum itself, or of the ascending aorta. It must be more frequent in youth and manhood, when scrofulous complaints are common, but here is a well-marked instance in a person sixty-one years of age.

Advanced as the disease was, and presenting itself under peculiarly favorable circumstances, the diagnosis was by no

means so easy as might be supposed. The tumour in the neck had appeared from within outwards: it had suddenly risen after a violent fit of coughing; it might, therefore, be presumed to have connexion with the lung; but, unlike abscess bursting into the lung from without inwards, or abscess of the lung itself bursting in the opposite direction, no impulse was communicated to it on coughing, and it was free from crumpling or crepitation. This supposition was therefore rejected. Still it might communicate with the pleural cavity, it might be an unusual pointing of an empyema bursting in the neck? The absence of impulse also militated against this notion; yet the resisting nature of the superficial and deep-seated fasciæ of the neck, and the size of the opening, might prevent any remarkable development of this phenomenon. At a subsequent period, when the tumour was punctured, this supposition appeared to receive every confirmation, the pus escaping in jets with each fit of coughing; yet it was not the true explanation.

The connexion of the tumour with the lung being untenable, and its connexion with the cavity of the chest being very doubtful, two diseases suggested themselves, which, taken in relationship with the whole history of the case, one or other of them appeared extremely probable. Had we to deal with intra-thoracic aneurism finding its way outwards—Was it an aneurism of the innominata or arch of the aorta? or, secondly, Was it malignant disease of the lung, with corresponding tumours in the neck,—the not unusual accompaniments of pulmonary or mediastinal cancer?

The mechanical effects of these diseases, intra-thoracic aneurism and intra-thoracic cancer, are similar. That the œsophagus and trachea, as well as the vascular and nervous systems of the upper extremity, were subjected to compression, from some cause, was obvious; the dysphagia, aphonia, irritative cough, orthopnœa, congested features and turgid veins, with neuralgic pains, proved this, while the diminished pulsation of the right-carotid, the nearly absent pulsation in the corresponding radial and temporal arteries,

together with the pain in this shoulder following the course of the ulnar nerve down to the fingers of this hand, were equally conclusive, that this pressure was chiefly exerted on the right side. The tumour entirely corresponded in situation with a detruding aneurism of the innominata; it was situated immediately above the sterno-clavicular joint on the right side of the neck, and, dipping behind the clavicle, it was, at the same time, accompanied with some fulness in the infra-clavian region. True, it was without pulsation, but the general circulation was feeble; though the tumour had only recently attracted notice, there were grounds for believing that the disease had existed for nearly a year; pulsation was, therefore, not unlikely to have disappeared; besides which, it is well known, that this symptom is by no means invariably present, but is not infrequently entirely wanting, the stethoscope also failing to discover the usual bruit. Is it surprising then, that, with a group of symptoms strongly indicative of aneurism, we hesitated to open the tumour sooner, and that we adopted the precaution of examining it with an exploring needle?

The least probable suspicion was, that the disease consisted in malignant degeneration of the lung. The evidence of extensive effusion into the right pleural cavity was all but conclusive,—indeed we entertained scarcely a doubt on the subject. However, with such universal dullness and nearly total absence of the respiratory murmur, there was no descent of the diaphragm, and the inter-costal spaces were not detruded, nor was there any perceptible enlargement of the side,—circumstances which were more than likely to coincide with an effusion so extensive and of so long a duration. It may also be observed, that the sanguinolent character of the expectoration and its scantiness favoured the opinion: and that all the physical signs of effusion may attend cancerous disease of the lung when, from the destruction or blocking up of a bronchus, the ingress of the air is prevented, is shown in a case of this description I have detailed in the 'Medical Gazette,' 31st March, 1843. But

the symptoms of effusion predominated, and rendered the belief of malignant intra-thoracic disease, or consolidation of the lung, improbable.

It is impossible to fix the period at which the abscess found its way into the right side of the chest, or into the pericardium. The physical signs of effusion into the left side were not observed. From the limited quantity of purulent matter found here, its escape into the side was apparently recent. The urgent dyspnœa, appearing three weeks after admission, very probably coincided with a more rapid accumulation in the pericardium, if not with the actual perforation of this sac and its immediate reception of the purulent fluid. In a somewhat analogous case of deep interest, in which an hepatic abscess burst into the stomach and also into the pericardium, recorded by Dr. Graves in the Dublin Journal of *Medical Science*, 1st January, 1839, the physical phenomena of effusion were preceded by the usual symptoms of pericarditis. In the above case, pain in the cardiac region and palpitation seemed to have been entirely absent, and the pathologist will not fail to observe that neither the pericardium nor the pleura (except the mediastinum) bore any marks of irritation occasioned by the presence of the purulent secretion which had escaped into the respective cavities. The friction sounds were therefore very probably absent.

I omit detailing the treatment pursued. With the view of removing the fluid from the chest, diuretics were prescribed immediately after admission, and sedatives were given to allay the irritative cough. Not the least benefit was derived from the means advised. Instead of relieving the cough and dyspnœa, opiates appeared to be positively injurious, and the muriate of morphia, so efficacious in subduing laryngeal and tracheal irritation, had consequently to be discontinued.

As I have already very far exceeded the limits I had proposed, I forbear further observations on suppurative inflammation of the mediastinum, a disease which seems to have been early recognised. It appears, however, to be sufficiently rare to merit this case being brought under notice.

Of the cases recorded none seem to have terminated in the same manner. Some years ago, a discharged soldier came before me with a fistulous opening between the first and second rib, about an inch and a half from the edge of the sternum, through which a bent probe could be passed for four or five inches behind this bone. He had received a blow on the chest several months before the abscess had burst, and was suffering from shortness of breath with a dry rasping cough. I have no doubt that this was a case of mediastinal suppuration resulting from the alleged injury: and blows on the chest seem to be the most frequent ostensible cause of the disease in question.

CASE OF

MOLLITIES AND FRAGILITAS OSSIUM,

ACCOMPANIED WITH URINE STRONGLY CHARGED WITH ANIMAL MATTER.

BY

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Received February 4th.—Read April 9th, 1850.

Mr. M——, a highly respectable tradesman, aged 45, placed himself under my care on the 30th of October, 1845. He was then confined to the house by excruciating pains of the chest, back, and loins, from which he had been suffering, more or less, for upwards of twelve months. On taking charge of the case, and on several occasions subsequently, I had the advantage of meeting Dr. Watson, whom the patient had consulted at the beginning of the preceding summer, and once or twice more recently.

Mr. M. was now much emaciated: his face was thin and sallow; his aspect expressive of suffering, though, when not actually under the influence of pain, he maintained his natural composure and habitual cheerfulness. The heat of the surface was below the natural standard, the pulse 86, and deficient in strength; the tongue furred; the appetite keen, often voracious, but the thirst not inordinate. The bowels were stated to be generally sluggish, but easily excited to diarrhœa, and the urine was reported to be natural in appearance and quantity.

For some days previous to our visit, the pain, which had usually occupied the trunk generally, became fixed in the left lumbar and iliac regions, obliging the patient to observe

a semi-bent posture, on account of the agony caused by every attempt at movement of the body upon the thighs. Pressure along the course of the spine did not create much uneasiness, but when made at the brim of the pelvis in front, on either side, where the iliacus and psoas muscles pass out to their insertion, the most exquisite tenderness was experienced. There was some painful retraction of the testicle, but no redness or swelling observed either in the groin or track of the cord. Irregular wandering pains about the chest and shoulders were complained of, but these were now reckoned comparatively trifling, as they had, at an early period of the illness, been extremely severe. The extremities, upper and lower, though much wasted, were free from pain, and could be exercised without difficulty or discomfort, provided their movements did not involve those of the trunk.

The abdomen was tumid from intestinal flatus, and the liver was judged to be of augmented volume; but in no other part of this cavity could any tumour or special enlargement be detected.

The chest presented the emaciated appearance observable in the rest of the body, with some flattening superiorly in front, on both sides. The breathing was unembarrassed, and, beyond some amount of mucous rhonci, the stethoscope gave no note of pulmonary lesion. Percussion elicited a clear sound everywhere, except in the precordial space, which was dull over a larger extent than natural, and the cardiac impulse was stronger than it ordinarily is in health, but no abnormal sounds were audible either in the region of the heart or in the course of the great vessels. It was observed that percussion, when forcibly performed, caused pain, but the circumstance did not, at the time, attract much attention, it being not unusual for sensitive patients to flinch under the gentlest tap.

The only positive information gained by the examination of the thorax was, that the heart was not in a satisfactory state. The exploration of this region was undertaken with some interest, and conducted with care, in consequence of the

patient ascribing his illness to a violent strain which he sustained fourteen months before, in vaulting out of an underground cavern. On coming to the ground, he instantly felt as if something had snapped or given way within the chest, and for some minutes he lay in intense agony, unable to stir. The violence of the pain having somewhat abated, he was able to walk to a neighbouring inn, and, after a night's repose, felt no inconvenience beyond some soreness and stiffness, which, however, he made light of, as he had for some time previously been subject to wandering pains at the breast and shoulders.

The accident just related occurred in September, 1844, while he was in the country, where he had gone for recreation and to recruit his strength, which had been impaired by close attention to business and much anxiety about a member of his family who had, a short time before, passed through a dangerous and protracted illness. Towards the end of the month, after his return to town, he consulted me respecting some dyspeptic troubles, mentioning, incidentally, the hurt he had received, and his being still incommoded by pain and stiffness of the chest, chiefly felt when he raised or flung back his arms. There was at that time no external mark of injury, nor any cough or dyspnœa. He was so much relieved by the application of a strengthening plaster to the chest, and carefully abstaining from bodily exertion, that, after the lapse of ten days, he discontinued his visits to me, and resumed his ordinary avocations. It appears, however, that, about three weeks or a month afterwards, he was seized suddenly, and without any evident cause, with acute pain in the chest and difficulty of breathing, for which he applied to a surgeon, who found it necessary to take blood from the arm to the amount of a pound, and to apply leeches and blisters topically. The abstraction of blood, he said, abated the pain, but was followed by great weakness, from which he did not rally for two or three months. In the following spring he had another severe attack, which was considered to be pleuritic, and treated by cupping. The pain, which in

this second attack was not in the chest but in the right side, between the ribs and hip joint, was not materially mitigated by the treatment, while the prostration of strength that followed the loss of blood was much greater than on the former occasion, and went on progressively increasing, with wasting, loss of colour, and slight puffiness of the face and ankles.

In this state the patient consulted Dr. Watson, who put him upon a course of steel and quinine. Under this treatment he improved rapidly; the pains became daily less severe, and by the middle of summer he had recovered so much that he was able to travel to Scotland. There, on the sea-coast, the improvement advanced, and for some time he was capable of taking active exercise on foot during the greater part of the day, bounding over the hills, to use his own expression, as nimbly as any of his companions. His appetite, which had at no time failed, became extremely keen, and he indulged it without restriction, particularly with the article of fish. This progress towards recovery was, however, suddenly checked by an attack of diarrhœa, which proved obstinate, and reduced his strength considerably. In September he returned to London, in a very debilitated state, but free from the excruciating pains which had tortured him during the spring and early part of the summer. He was again put by Dr. Watson on a course of tonics, and seemed to be gradually improving, when he was seized, a few days before I saw him, with the lumbar and sciatic pains, under which we found him suffering so severely.

With the view of meeting the prominent and most urgent symptoms of the case, the warm bath was prescribed, with Dover's powder at bedtime, and the acetate of ammonia, camphor julap, and compound tincture of camphor every five or six hours.

As some amount of œdema had been observed at one period during the progress of the patient's illness, I procured a portion of his urine for examination. This specimen was opaque, acid, and of high density, the specific gravity being

1035°, but it gave no indication of the presence of sugar to Trômers or to Moore and Palmer's tests. Treated by heat to ebullition, but not under that point, it was found to abound in animal matter, which, when isolated in this way, exhibited all the characters of albumen. With nitric acid, however, this urine displayed anomalies of a remarkable kind. On the addition of the acid no immediate precipitation took place; on the contrary, the urine, previously cloudy or turbid, became instantly clear, and retained its transparency for an hour or an hour and a half, when it was found to have formed into a firm yellow mass, which, unlike the coagulum resulting from the action of nitric acid upon serum sanguinis or ordinary albuminous urine, underwent complete solution on the application of heat, but again consolidated on cooling. Such were the effects when operating with the acid at the ordinary temperature of the atmosphere. When, however, the urine was previously heated to ebullition and, while still fluid, allowed to cool down a few points, the coagulum was almost instantly obtained, and like that resulting from the slow operation in the cold, suffered redissolution on the temperature being raised to the boiling point.

Oxalic acid threw down a copious white precipitate from the urine, and tannin and tincture of galls turned the whole into a tough mass.

The exertion of getting into the bath had been found productive of such acute suffering, that its use was discontinued, and as a slight catarrh, attended with some febrile movement, came on, tartrate of potash, with ipecacuanha, was substituted for the acetate of ammonia. The Dover's powder procured better nights, but during the day every motion of the trunk was attended with excruciating pain, great care and no little cautious manœuvring on the patient's part being required to enable him to get in and out of bed on all-fours. The urine became more abundant under the use of the neutral saline, and deposited a copious sediment of triple phosphates. It still reddened litmus paper, maintained its high specific gravity, and continued

to exhibit the same behaviour towards heat and nitric acid.

On the 3d of November, Dr. Prout joined Dr. Watson and myself in consultation. The slight febrile attack just noticed had passed away, but the patient was weaker, and confined to bed from inability to keep the erect or sitting posture. There was much flatulence of the abdomen, and marked fulness and hardness in the region of the liver. The pains had quitted the left side, and now occupied the right hypochondre, and the right lumbar region. The urine was found, on this occasion, to exhibit chemical reactions precisely similar to those already described.

It was agreed to resume the citrate of iron and quinine, to continue the opiate, and to have recourse, from time to time, to vesicatories and counter-irritants.

On the 9th the urine presented an altered appearance, being turbid and thick, like pea soup. The phosphates had given place to an enormous quantity of lithates which, owing to the great density of the urine (1040°), remained for hours suspended. Coincident with this altered state of the urine, an improvement was observable in the condition of the patient, who had slept well for two nights, and was able to sit up and to walk about his room, feeling little of the racking pains which had formerly crippled him. The urine, however, contained the same amount of animal matter, and its peculiar properties continued unchanged, except that more prolonged ebullition was now required to reduce it to the solid state.

The improvement did not last long; on the 11th the patient reported a bad night from an oppression caused by phlegm in the chest, and consequent cough, which raised a pain in the right hip and region of the kidney. He had also an attack of diarrhœa, brought on by a dose of rhubarb and soda given to correct flatulence, the urine was now more copious, less loaded with lithates, and reduced in density to 1034°. It bore brisk ebullition for several minutes without coagulating, but on being withdrawn from the flame

of the lamp, coagulated instantly into a uniform mass resembling blanc-mange in colour and consistence. The coagulum did not, however, melt on the renewed application of heat, nor by boiling in water.

Dover's powder, with aromatic cretaceous mixture, and a blister over the kidney, were prescribed.

On the 13th, a better night was reported, undisturbed by cough or diarrhœa, but the patient, though easier, was weaker, and looked more anæmic. The urine had again become loaded with lithates, presenting the appearance of thick gruel; it was acid, very spumous and glutinous, and its specific gravity had risen to 1040°.

On the 15th, Dr. Bence Jones, who had been for some time engaged in examining the composition of the patient's urine, met us in consultation. At his suggestion, alum was added to the tonics in use, with the view of checking the exhausting excretion of animal matter; and for several days a hope was entertained that this object might be realized. The urine was found to vary more in density than it had yet done, fluctuating between 1035° and 1026°, with a correspondent reduction in the amount of animal matter yielded to heat, but the reactions with nitric acid were exactly the same as before.

Under the diminished waste by the kidneys a temporary improvement took place; the pains were more tolerable, the patient was able to sit up daily for an hour or two, and continued to enjoy his food; but towards the end of November he again became weak and languid, and on the 7th of December he experienced a dreadful aggravation of lumbar pains. Crude opium and the preparations of morphia were severally tried, but they not only failed to procure sleep or relief, but disturbed his rest and confused his head. They were consequently discontinued. Some mitigation of suffering took place under the liberal use of Dover's powder with the guaiacum mixture, and the external application of the alcoholic tincture of aconite; but progressive weakness and emaciation went on with accelerated pace, and the

patient, now almost constantly racked with pain, was unable to leave his bed; he lost his appetite, took scarcely any nourishment, and on the 1st of January died exhausted, in the full possession of his mental faculties, and evincing, in his supreme hour of suffering, the same admirable fortitude and patient endurance which he had displayed throughout the whole course of his trying illness.

On the 28th of December the specific gravity of the urine, which for several days had been permanently high, sometimes 1040°, was found to have fallen to 1022°, but on the two following days it had mounted to 1036° and 1038°; when of the comparatively low density just mentioned, it coagulated, under heat, into a loose diffluent mass, like custard.

Inspection.—The post-mortem examination was made, thirty-six hours after death, by Mr. Shaw, in the presence of Dr. Watson, Dr. Bence Jones, Dr. Ridge, and myself. The body had undergone no remarkable amount of decomposition, but presented great emaciation.

Thorax.—The upper region of the chest appeared somewhat flattened, and below the clavicles, sunken. The muscles on being exposed were observed to be flabby, of a grayish colour, and bloodless.

On dividing the cartilages at the usual place, it was found that the adjoining extremities of the osseous ribs crumbled under the heel of the scalpel, and on prosecuting the dissection it was discovered, that all the ribs, throughout their whole length, were soft and brittle, so that they could be easily cut by the knife, and readily broken, at any point, by the exertion of a very moderate force. They had evidently lost much in size and weight, as well as in consistence and tenacity; their outer encasement, or laminated portion, was very thin, loose and fragile, yielding and crackling when pressed between the fingers and thumb; their interior was charged with a soft gelatiniform substance of a blood-red colour and unctuous feel. The sternum was in a similar state of softening and fragility, first bending, and then

snapping across when raised and turned back; but its under surface presented a deeper and more extensive redness, and its cancellated structure was more loaded with the coloured matter. The appearance of this bone may be seen almost exactly pictured in Mr. Solly's plate of the sternum of Sarah Newbury, whose case of mollities ossium he has detailed in the 'Transactions of the Society,' the only difference being, that it did not present to the same extent as Newbury's the cell-like character.[1]

The lungs showed no serious lesion; here and there they were emphysematous, and partially adherent to the costal pleura by weak and slender membranous filaments; but they were quite free from tubercular and other deposit.

The pericardium was of healthy structure. It contained about two ounces of clear serum, and its capacity appeared large in proportion to the size of the heart, which was rather under the normal dimensions and firmly contracted. The left ventricle embraced a small coagulum; the right contained one somewhat larger and partly fibrinous. The valves at the outlets of the heart were very thin, but no other morbid appearance was observed in this organ, and the great vessels were sound.

Abdomen.—On opening this cavity the stomach presented itself of great dimensions, occupying the whole of the epigastrium, both hypochondres, and half the umbilical region. Its walls were of natural thickness, and neither exteriorly nor interiorly was there any trace of inflammation, but some of the vessels ramifying on the surface were unusually large.

The liver was voluminous, but of healthy structure; the gall bladder was full of bile; the pancreas and spleen were sound.

The right kidney was of normal volume and shape; its proper tunic was of the usual fine texture, and easily separated. The surface of the organ was smooth and of natural colour, without the slightest appearance of mottling. On section it was found to be somewhat congested, but in other

[1] Medico-Chirurgical Transactions, Vol. XXVII, 1844.

respects perfectly healthy. Neither with the naked eye, nor by the aid of a glass, could the smallest trace of granular degeneration be detected, nor, indeed, the least deviation from the natural organization and arrangement of its several portions. The left kidney was rather larger than the right, but equally sound as its fellow. The urinary bladder was healthy.

The intestines were nearly empty, and presented no unusual appearance. The mesenteric glands were free from disease.

Spine.—After the thoracic, abdominal, and pelvic viscera were removed, the spine was examined. The three upper divisions of the column were found to have undergone, more or less, the same morbid change of structure which was discovered in the ribs and sternum. All presented the same characters of softness and brittleness, but the dorsal and lumbar had evidently suffered most from morbid degeneration and interstitial absorption, their bodies scarcely equalling those of the cervical in thickness.

With the lumbar vertebræ disappeared the characters of active disease and disorganization. The sacrum and flat bones of the pelvis were unyielding and impenetrable by the knife, but in colour they exhibited, it was thought, an unnaturally grey tint. Beyond this the examination was not prosecuted, as the cylindrical bones of the extremities were found to resist all efforts to bend or break them by manual force.

From the foregoing details it will be seen, that although this case was stamped with characters of the most striking and aggravated kind, its real nature remained unknown to the last. The affection to which it bore the nearest resemblance was a severe attack of lumbago or sciatica; but it was evident from more than one feature of the complaint, that sufferings so intense must have a deeper seat and more formidable cause than mere muscular or neuralgic rheumatism. In particular, it was ascertained, that the patient

had lately lost strength and wasted rapidly, although his appetite continued keen, and he was consuming a much greater amount of solid animal food than he ever had been in the habit of taking when in perfect health.

The discovery of albuminous matter in the urine naturally suggested the existence of Bright's disease; but that supposition was abandoned, on a closer consideration of the character of the symptoms and the peculiar condition of the renal excretion. The leading symptoms were not such as usually accompany that affection. Atrocious pains, like those which assailed our patient, constitute no part of Bright's disease, while two of its most constant attendants, dropsy and cerebral disturbance, were absent. The presence in the urine of an animal principle alien to it in a normal state, might, it was at one time supposed, be attributable to erroneous vital chemistry, involving a perversion of the primary or secondary assimilating processes. This explanation was, however, deemed far from adequate; for, admitting the probability of these functions being in fault, the question as to what particular organ was affected, and what the special lesion that could give rise to a pathological condition so very anomalous, remained unanswered, and the case closed amid the uncertainty and doubt which had surrounded it from the beginning.

But the information denied to the most anxious inquiries, prompted, alike, by the obscurity of the complaint and sympathy with the sufferer was yielded to the first touch of the anatomist's knife. The crumbling ribs proclaimed the presence of a disease of the osseous system, not more remarkable for its phenomena than terrible in its effects. Mollities and fragilitas ossium is, fortunately, not a common disease, but almost all the records of it which we possess agree in representing it as one scarcely paralleled for the amount of pain and misery which it inflicts. There was, therefore, little hesitation felt, even on the threshold of the post-mortem investigation, in connecting this early announcement with the antecedent history of the case, as well as its most unac-

countable accessory—the peculiar condition of the urine. Every successive step in the investigation led to the same conclusion, by disclosing a similar disorganization of structure in other districts of the body, which had, during life, been the seat of suffering.

The bones were not subjected to chemical analysis, but their diminished bulk, their lightness, flexibility and brittleness sufficiently attested their having been, in great measure, despoiled of their natural constituents, both animal and earthy,—in that condition, in short, which Mr. Solly has appropriately denominated "Osteo-malacia fragilis rubra." The identity of the two cases was further established by the minute morbid anatomy of the diseased structures in each. Mr. Dalrymple, who, in our case, kindly undertook the microscopical examination of two of the affected bones (a rib and two lumbar vertebræ), has given the result of his observations in an interesting paper, communicated to the 'Dublin Quarterly Journal of Medical Science,' for June 1846. It would appear from this investigation, that the disease had commenced in the cancellated structure, but that the external laminæ were also involved, being much reddened and atrophied. The material filling the large cancellous cavities in the interior was found to be composed of granular matter, oil globules, nucleated cells, constituting the bulk of the mass,—a few caudate cells and blood disks extravasated largely amongst the other cells, and giving the red colour to the gelatiniform mass.

This account accords very much with Mr. Birkett's description (given in Mr. Solly's paper) of the microscopic anatomy of a bone affected with mollities ossium, and seems to point to a disease essentially malignant in its nature, but differing, according to Mr. Dalrymple, in some special particulars from the true malignant disease of bone as we are accustomed to regard it. Instead of progressively reproducing and developing themselves without limitation, the new and morbid formation which replaced the original and sound structure seem to have been, at an early stage of their

existence, removed by absorption and carried out of the system.

The disease, in the present case, could not be traced to any direct exciting cause. The patient was of temperate habits and exemplary conduct; he married early, had a numerous offspring, and, with the exception of two or three severe attacks of frontal neuralgia, enjoyed uninterrupted good health, till within a year of the first date of this illness, when he was observed by his family to be easily fatigued, and to stoop in walking. I have also been informed by a male relative, that he complained at that time of being incommoded by frequent calls to make water, and was much disconcerted by finding his body-linen stiffened by his urine, although there was not the least urethral discharge. From these circumstances it may be inferred, that the malady had made considerable progress at the period of the accident, which probably caused a breach of continuity in the already fragile case of the diseased sternum and ribs, the consequence of which would necessarily be the immediate and subsequent agonies which he suffered.

With reference to predisposition, and certain alleged causes of the disease, I must not omit mentioning, that the patient's father died, at no very advanced age, a martyr to gout, and his mother, rather suddenly and unaccountably, a few days after undergoing extirpation of a scirrhous tumour from the breast, performed by a distinguished London surgeon.

While the case came to the same fatal conclusion as all recorded examples of this formidable malady, it is not unimportant, in a practical point of view, to note that the juvantia and lædentia corresponded very closely with the experience of preceding observers. Whatever amount of improvement was at any time remarked, took place, under corroborating therapeutic measures, whilst an aggravation of suffering invariably followed depressing remedies, or exhausting influences. Twice was the disease seen to make a start after the loss of blood; and on the second occasion its career was arrested in a remarkable manner by a powerful tonic,

and the invigorating influence of country air; the accidental supervention of diarrhœa gave it renewed and resistless impetus, the few temporary checks and mitigations which it received in its subsequent course, occurring under the use of means directed to uphold the constitutional powers. In the case detailed by Mr. Howship, sanguine hopes of recovery were at one time entertained from the great amelioration which took place from the conjoint influence of Peruvian bark and sea air. These facts are not without their practical application, and might be more valuable if we could detect the disease in an early stage, when it may be presumed to be more amenable to appropriate treatment. On this point, the remark of Mr. Curling is not to be disregarded, viz. that we should bear this disease in mind when treating pains of the limbs of an obscure and intractable character.

That the disease, in the present instance, was so long under observation without being recognised, arose from the circumstance of its having been limited to a district of the body in which the bones are not often subjected to the effects of violent muscular exertion or external force. Like many other severe and fatal maladies, the affection is obscure in its origin, and insidious in its progress. In no recorded case with which I am acquainted was it discovered, or even suspected, till curvature, displacement, or actual fracture of a cylindrical bone had occurred, and unequivocally declared its presence. Down to some such deplorable incident in the history of these cases, the patients were supposed to be labouring under some grievous form of gout, indomitable rheumatism, or syphilitic contamination; notwithstanding the expressive character of many of its leading features, there is reason to fear that, without some supplemental token of more definite and distinctive significance, the disease will continue to elude detection, till it has arrived at its stage of full development and incurability. It is this consideration that, in my mind, invests the properties of the urine, voided by this patient, with their chiefest interest.

Amongst the striking phenomena presented by mollities

ossium, whether occurring as simple softening, or softening conjoined with brittleness of the bones, an altered condition of the urine has been very generally observed. The alteration hitherto noted has been an augmented proportion of the earthy constituents of that fluid. In some cases, as in that of Sarah Newbury, this has been demonstrated by chemical analysis only. In other instances the calcareous matter has been deposited in a palpable form, and to an enormous amount, as in the celebrated case of Madame Supiot, which was an example of pure softening, and in the instance recorded by Mr. Thomson, which was one of softening and fragility. Even when nothing peculiar has been observed in the appearance of the urine, there have been found, after death, calcareous depositions in various structures, as in Mr. Curling's case, where the deposit was in the lumbar and iliac glands, and in Mr. Solly's second case, where, although earthy matter does not appear to have been present in the form of a sediment, the urine, on analysis, yielded three times the quantity of healthy urine, and on dissection, phosphate of lime was found clogging up the calices and pelvis of the kidney, forming there a solid calculus.

These facts justify the general belief, that in mollities ossium the earthy parts, so remarkably deficient in the affected bones, are in the first instance taken up by the absorbents, then separated from the circulation by the kidneys, and finally swept away with the urine, as the debris, so to speak, of a dilapidated and mouldering structure. Assuming this to be the process going on in *softening* of the bones, we should be led by analogy to infer, that in an opposite condition—fragility—their animal constituents, the albumen, fibrin, and gelatine, to which they owe their natural cohesion and tenacity, would in like manner be taken up by the absorbents, and thrown out of the system by the kidneys. Hitherto, however, there has not been, so far as I know, any positive evidence adduced that such is the fact. It is true, that in Mr. Howship's case we find mention made, on two occasions, of the urine being loaded with albumen, but the

agency by which the presence of this material was ascertained is not stated; and the account given by that writer is not altogether decisive of the nature of the deposit which he denominates albumen.—"The urine, on examination," he says, "was loaded with albuminous matter, which, on cooling, formed a sediment; but when, by the obliging attention of Professor Brande, it was submitted to analysis, nothing decidedly singular in its constitution was ascertained." Again, he says, "the urine passed this morning was scanty and of the former brown colour, but deposited a fine albuminous sediment, a shade lighter in colour than the fluid itself." This account would imply, that the albuminous deposition took place spontaneously, a mode of separating not met with except when the albumen occurs as a component of purulent or muco-purulent matter mingled with the urine, not in chemical union as in ordinary albuminuria and the case before us. From the fact of the deposit not taking place till the urine cooled, it is possible, that Mr. Howship, trusting to inspection alone, may have mistaken for albumen a copious sediment of the triple phosphates, or of pale lithates, which, without the aid of tests, cannot be easily discriminated from deposit of pus or mucus. At all events, this passing notice of the presence of albumen, does not appear to have attracted the attention of subsequent observers, for we find Miescher,[1] one of the latest systematic writers on diseases of the bones, suggesting a breaking up and absorption of their animal constituents as the true explanation or "ratio symptomatum," of fragility. After stating the familiar fact, that in softening the earthy matter is absorbed and excreted with the urine in the form of a cretacean sediment, he proceeds to observe, with respect to fragility—"causa proxima fragilitatis quesita est in resolutione partium ossis animalium, qualem ars ossa in machina Papiana coquendo, vel calcinatione efficit, earundumque resorptione; quanquam chemia hanc opinionem nondum

[1] De Inflammatione Ossium, eorum q. Anatomia generali. 4to.—Berol., 1836.

comprobavit." Whether the desired demonstration be found in the case just submitted to the Society, must be decided by future and more extended observation of this remarkable disease. In the meanwhile, as far as the evidence of a single example avails, we have undoubted proof of the discharge from the body of an amount of animal matter, apparently equivalent to what was missed from the bones. It would, however, be premature, and not strictly accordant with the analogy afforded by other diseases, to assume the invariable concurrence of these two conditions in mollities and fragilitas ossium. Nature does not always rid the system of morbid products, and, when disposed to do so, she has a choice of emunctories whereby to eliminate effete and excrementitious materials. Indeed, evidence to this effect, of no equivocal character, is supplied by the strange symptoms which have been frequently seen to attend the disease. Besides the deposition of a chalky sediment in the urine very generally observed, the cutaneous and other excretories have in some cases been actively employed in throwing off products of an unnatural kind. In one instance the urine, it is said, was high coloured, turbid and fetid, and the hands and feet were constantly covered with an unctuous humour, which, as it dried, thickened into scales; in another case, the perspiration was abundant, and possessed an unusual fetid odour; in a third, there were copious sweats, and almost incessant salivation; and in the extraordinary case of Madame Supiot, the saliva as well as the urine stained the linen black. Mr. Curling, in noticing these facts, makes a remark, the justice of which cannot, I think, be questioned:—"Now all these circumstances would seem to indicate, that the blood was loaded with something which it was glad to get rid of by any of its natural outlets.[1] In the instance before us, it would seem that the kidneys had been selected for this purpose, and had not only proved equal to the novel office assigned them, but, what is more extraordinary,

[1] On some of the Forms of Atrophy of Bone.—Medico-Chirurgical Transactions, Vol. XX, p. 391.

had discharged the task without sustaining, on their part, the slightest danger. During the two months that the case was under my eye, the solid animal matter daily cast out of the body in this manner was roughly estimated, from repeated observations, as not much less than a moiety of the entire quantity of urine excreted. Thus on the 4th of November, when the patient was passing forty ounces, the daily average, sixteen ounces of it, having a sp. gr. of 1038°, yielded, on boiling, a firm coagulum weighing nine oz. and two dr., while the residual liquor which had resisted coagulation, with an additional quantity supplied by slow exudation from the clot, amounting altogether to eight ounces, was found to exhibit a correspondent reduction in density, its sp. gr. being only 1022°.

But enormous as was the quantity of animal matter thus shown to have been incorporated with the urine, its presence had nearly escaped observation. It is true that its discovery was effected by means of heat and nitric acid, the tests commonly employed, singly or conjointly, for displaying albumen when it exists either as a natural constituent of animal fluids, or as a morbid component of urine; but in the present instance these agents, when employed in the usual way, failed entirely as tests, and it was not till they were applied in a modified manner, that they succeeded in detecting and disengaging the alien ingredient, displaying at the same time a set of novel and remarkable reactions which seemed to bespeak the existence of some special disease bearing but a distant relation to any of those derangements of function or structure which we are accustomed to associate, in a pathological sense, with ordinary albuminuria.

The most striking peculiarity which distinguished this from any other specimen of urine I ever examined, and in an especial manner from that excreted in Bright's disease, was its behaviour with nitric acid. The reaction of nitric acid and ordinary albuminous urine are so uniform and constant, that they are received as the most trustworthy evidence of the presence of albumen, the acid never failing to produce an

immediate and notable coagulation in urine containing the foreign ingredient. But in our patient this familiar and convenient test failed, like heat, to give any immediate intimation of the presence of animal matter. On the contrary, the absence of albumen was, in the first trials, not unnaturally inferred from the circumstance of the urine, previously hazy, becoming instantly clear on dropping the nitric acid into it; and it was only on inspecting the test tube some hours afterwards, that its contents were seen to have undergone the remarkable change already described. I was at first inclined to think that some mistake had occurred, but on repeated trials with other specimens, and closely watching their course, the results were always found to be the same. A slight yellowish opacity was the first announcement of a change going on in the mixture; this gradually deepened in tint, with increasing consistency of the fluid, till the whole congealed into a bright and somewhat resplendent mass, presenting very much the appearance of a heap of nitrate of urea scales blocking up the tube. It further resembled that substance in liquefying on the application of heat and again concreting on cooling; but no true crystalline arrangement could be perceived, the sparkling appearance being evidently due to numerous air-bubbles entangled in the mass. Perfect redissolution took place when the tube was held for a few minutes in the flame of a spirit-lamp, or plunged into hot water at 160° or 170°, the ordinary coagulating point of albumen; and the fluidity thus acquired persisted under ebullition, however prolonged.

Not less interesting was the modifying influence of temperature in another particular—viz., the time required to bring about the change in question. An hour was the shortest period in which coagulation was effected by the acid when the experiment was carried on at the ordinary temperature of the atmosphere, whilst the same result was almost immediately obtained, if the urine were previously boiled and suffered to cool. A rather pretty variation of the experiment, exhibiting this modifying influence, consisted in

heating to ebullition the upper portion of urine contained in a tall test-tube, and then adding the nitric acid: the acid instantly discharged a slight opacity of the hot fluid due to the presence of phosphates, but as soon as it reached the cold stratum below, a production of yellow coagulum was seen to take place, and continue to form in the track of the acid as it traversed the fluid to the bottom. Every successive drop thus added was followed in descending by a slender yellow trail resembling a string of vermicelli, till, by their accumulating, they occupied the whole of the lower division of the tube, like a plug of yellow butter, contrasting strikingly, at the moment, with the clear fluid above. The contrast did not, however, last long, for as the upper stratum of urine cooled, it became first turbid, then opaque and yellow, the entire contents of the tube soon presenting one homogeneous mass of golden hue. This, like the coagulum obtained in the previous experiments, melted on being heated, and reformed on cooling.

It cannot be doubted, I presume, that reactions such as I have described must have belonged to a peculiar kind of morbid urine. It must, however, be a peculiarity of rare occurrence, for I have not, in the course of my reading, met with any notice of albuminous urine presenting reactions precisely similar. The nearest approach to it I find briefly mentioned in Solon's Treatise, p. 423.[1] It occurred in the case of a young rheumatic subject, who was attacked with endo-carditis, and was improving under sanguinous depletion. For the space of two days this patient, it is said, voided albuminous urine presenting some remarkable characters. It yielded a copious coagulum both to heat and nitric acid, but that resulting from the latter on being heated suffered redissolution. The appearance, here, was temporary, and Solon was inclined to consider it analogous to what takes place in simply precipitable urines, or when nitric acid is added in large excess to a feeble albuminous precipitate.

[1] De l'Albuminurie. Par Martin Solon, D.M.—Paris, 1838.

It was, of course, an object of considerable interest in our case to determine what was the precise nature of the substance resulting from the action of the nitric acid on the urine—whether a peculiar modification of albumen, pre-existing in the urine as a morbid ingredient, and liberated from it in the form of a precipitate or a new compound evolved during the experiments, under the play of chemical affinities. The task of investigating this point fell into able hands. In one of the first procured specimens of the urine, Dr. Prout found the urea and lithic acid in about the usual proportion; and from the whole of the phenomena exhibited in the course of the inquiry, he pronounced the animal matter present to be albumen in some peculiar state of combination or condition. In a note with which he favoured me at the time he says—"I have found albumen in this state before, but never in such large quantity. I regard it as the material which, if the kidney had done its duty, would have been converted into lithate of ammonia."

The more elaborate analysis by Dr. Bence Jones, the result of which was communicated to the Royal Society in April 1847, and published in the 'Philosophical Transactions,' Part i, for 1848, confirm the view entertained by Dr. Prout. He succeeded in separating from the urine and from a quantity of combined ordinary albumen a substance displaying, among other characters, the peculiar reactions with nitric acid so strikingly seen in the original experiments. This substance, he ascertained, on ultimate analysis, to be an oxide of albumen, the hydrated deutoxide; and by the same reaction—the solubility of the nitric acid precipitate when cold—a similar substance in small quantity may be detected, he tells us, in pus and in the secretion from the vesiculæ seminales.

The limits of a paper do not permit me to refer more at length to Dr. Jones's researches and corollaries, which are highly interesting; but they are doubtless well known to most of the members of this Society, and are accessible to all in the 'Philosophical Transactions' and medical periodicals. My own share in this part of the inquiry, it must have been

seen, was very humble; but the ordinary means of examination at the command of the practical physician unversed in the nice processes of analytical chemistry, were sufficient to bring me acquainted with physical properties and chemical reaction, which, independently of their apparent direct relation to the disease which destroyed the patient, seemed to me deserving of a detailed account; and I shall be content if I have succeeded in pointing out to future observers, gifted with the requisite qualifications for conducting researches of a higher order, certain definite and distinctive characters by which a peculiar and hitherto unrecorded pathological condition of the urine may be recognised and identified.

CASE OF VERY LARGE

HÆMATOCELE OF THE SPERMATIC CORD,

PROVING FATAL AFTER TEN YEARS.

BY

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TO WHICH IS ADDED,

A CASE OF VERY LARGE

HÆMATOCELE OF THE TUNICA VAGINALIS,

IN AN OLD MAN, TERMINATING FATALLY.

BY

THOMAS BLIZARD CURLING, F.R.S.

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Received February 9th.—Read April 23d, 1850.

Hæmatocele of the spermatic cord is a rare disease, if we may judge from the scanty notices of it to be met with, even in the works of those authors who have treated specially of the affections of the male generative organs. Indeed little has been added to our knowledge of it, since it was distinguished from other effusions of blood in this region, and in particular from hæmatocele of the tunica vaginalis, by Mr. Pott. This great surgeon, in his treatise on the Hydrocele, has related three examples of hæmatocele of the cord, all of which were comparatively recent when brought under his notice. In all three a considerable tumour had suddenly arisen in the inguinal canal, extending through the ring into the scrotum, but not involving the testis, which remained distinct and moveable at the lowest part of the swelling. A strain at stool, or a sudden exertion in lifting a heavy weight,

had been the immediate cause of the tumefaction, which had much the appearance and feel, though unattended with the symptoms, of a hernia. In all these cases, incisions promptly made into the parts by the surgeon, proved the enlargement to consist of an effusion of blood into the areolar tissue of the cord, within the spermatic fascia; and, in one of them, the fluid was abundant enough to have formed for itself a cavity, as it is stated that the operator had no sooner cut through the containing membrane, than a large quantity of blood, partly fluid, and partly grumous, burst forth, and the whole tumour subsided, &c.

Boyer[1] notices this affection, but in a manner which indicates that he had rather derived his description from the cases recorded by Pott, than from his own experience, and he gives no new example of it. By Sir Astley Cooper[2] it is passed over in silence. Mr. Curling, however, in his recent able work, devotes a section to hæmatocele of the cord, and describes two examples; both of small size, preserved in St. Bartholomew's and the Hunterian museums. In these, blood seems to have been extravasated into the sac of a pre-existing hydrocele of the cord, and the morbid parts had probably been removed only after death.

The case, of which I now propose to offer some particulars to the Society, is a remarkable instance of the course which this form of internal hemorrhage may run, and of the enormous size which such a tumour may attain, if not interfered with; as well as of the manner in which it may at length prove fatal.

The subject of it was a Leicestershire farmer, nearly sixty years of age, and of good constitution. About ten years before his death, which happened at Christmas, 1848, he was thrown from his horse against some railings, and probably (though he thought not) received a blow on the right groin, for a swelling appeared there immediately afterwards.

[1] Traité des Maladies Chirurg., tom. x, p. 229.

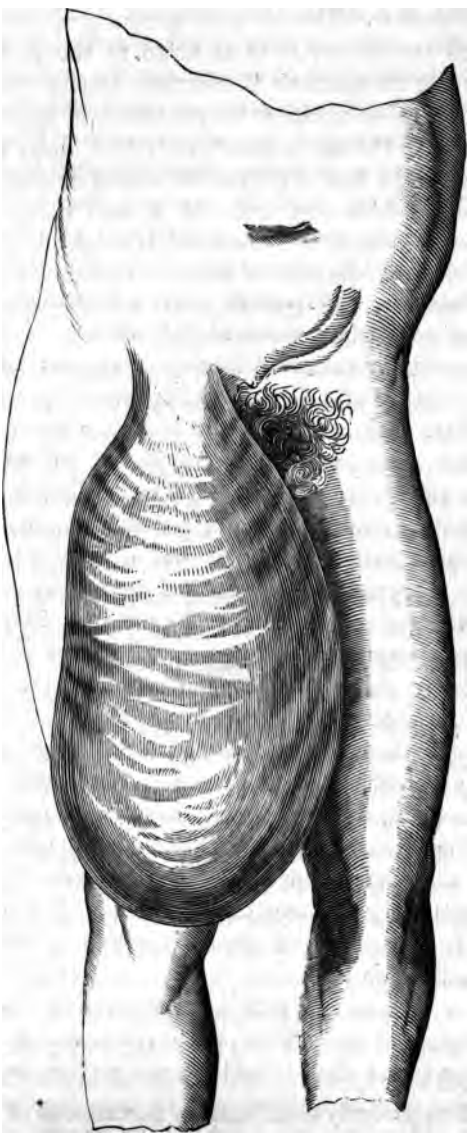
[2] Observations on the Structure and Diseases of the Testis.—London, 1836.

From Mr. Dalley, the surgeon who saw him at that juncture, and who had watched his subsequent progress, I learnt that this swelling was confined to the inguinal canal, and at first sight resembled a hernia. It could not, however, be reduced; it had no impulse from coughing; it was accompanied with ecchymosis, and there were no symptoms of strangulation. Under simple treatment, the pain and ecchymosis gradually subsided, and he resumed his ordinary active pursuits; but the swelling remained unaltered, as large as a hen's egg, oval, elongated in the direction of Poupart's ligament, and firm, but elastic. There was no glandular enlargement, and it ceased to give him any particular uneasiness. It was seen from time to time by the surgeon, and was still found to have an elastic, rather firm and solid feel, and to be limited to the inguinal canal.

Up to three years ago, it had remained in the same situation, having merely undergone some slow enlargement, when, at that date, during exertion in walking, it was felt by the patient to become suddenly larger and heavier: and on examination, this increase was found to depend on a vast effusion of blood, not merely about the canal, but into the tissues of the scrotum, so that the whole of these parts were enormously distended, and it was impossible to ascertain what the condition of the testicle or tunica vaginalis might be, though they had previously been healthy. When time had been allowed for the disappearance of the ecchymosis, and the integument had regained its natural colour, the tumour manifested no disposition to recede, rather indeed to augment in size, and the surface of the scrotum began to exhibit large distended veins meandering across it. There was fluctuation, and a trocar was cautiously introduced by Mr. Paget, of Leicester, who had been called in to the case soon after the period when this second enlargement had occurred. "On introducing the trocar," says Mr. Paget, in a note dated Dec. 3, 1848, "nothing followed but a free gush of blood, mixed arterial and venous, and I thought I had committed the mistake of plunging a trocar into a vascular tumour, from which might sprout an abundant and bleeding fungus. To

my great delight, however, it kindly healed; and though this was nearly two years ago, ulceration and fungus have not yet appeared, nor does the man's complexion bear the tinge of malignant disease. The tumour, meanwhile, has attained a vast size (I should say it is as large as the abdomen), and has never lost its deceitful fluctuation, so that another practitioner has been induced to puncture it again yesterday week and with the same result, only that now, when called again to see it, I find a *tympanitic* sound or percussion over the upper third, or two fifths of it, and also, on shaking the tumour, a sound like that which would be produced by agitating a thick fluid in a vessel containing air. This is heard as well as felt, and the patient assures me was not present till after the last puncturing."

On going down to see the patient on the 7th of December, I was very much struck with the enormous dimensions and weight of the tumour, far exceeding anything I had before seen. The patient had long been confined to his bed, from sheer inability to drag so great a substance about with him, and he was now also much reduced in strength, and had a worn and haggard countenance. He had been lying habitually on his back, with the tumour resting on the right thigh, and it had become moulded by constant pressure to the shape of that part. It reached to the patella, had an oval shape, and was so heavy, that it required two hands and no slight effort to raise it from its bed. Its neck ran up into the inguinal canal, but there was no appearance of any glandular disease either there or in the abdomen. Its surface was crossed by many very large veins, several as large as writing quills, which occupied deep grooves that might be felt in the hardened tissue of the dartos. The majority of these vessels took a nearly transverse course over the tumour, about an inch apart, and in somewhat regular parallel lines. The skin was dark coloured and congested, and presented the cicatrices of the two punctures which had been made into it. At the seat of the more recent one, and also in another spot, there might be felt through the skin an opening or deficiency in the wall of the dense and apparently membranous investment of the tumour.



These seeming openings were circular, larger than a crown-piece, and felt like holes punched out of a piece of parchment, so sharply defined was their margin under the integument, and so soft and elastic the substance of the tumour within their limits. In most other parts, the feeling was that of a dense, solid mass, but in some there was a doubtful sense of fluctuation. One thing, however, was quite clear; the right testicle, with the epididymis, was at the very lowest extremity of the tumour, most distant from the abdominal ring, and rested on the knee-joint. It appeared large from congestion, but slipped about naturally, and formed no part of the diseased mass, and I have no doubt the tunica vaginalis was free from adhesions. Percussion gave a tympanitic sound over the more elevated portions of the tumour, and on shaking it, a proceeding rendered difficult by its great size and weight, the sound of air and fluid mingling was very audible.

This last sign, with the low irritative fever under which the system was labouring, rendered it probable, that the contents since the last puncture had fallen into a state of decomposition; and therefore, notwithstanding some doubt still hanging over the case, it was deemed desirable to lay open the integuments to a limited extent, in order to afford vent to the gas and other putrid matters. For this purpose, a spot was chosen where the covering was thinnest, and a trocar being thrust in between some of the large venous channels, there was at once an escape of much fœtid gas and of some dark brown blood of the consistence of treacle, evidently putrid. As no hemorrhage occurred to interrupt this proceeding, the opening was now enlarged with a bistoury to an extent of three inches, with the effect of allowing issue to a further great quantity of the same kind of blood, mixed with large masses of old coagulum, not unlike that met with in aneurismal sacs, altogether nearly filling two large wash-hand basins.

It now became evident, that the tumour was an immense sac, situated in the course of the spermatic cord, and filled with blood, and that it had arrived at that stage when the only hope for the patient was in the complete evacuation of its contents. As for a summary removal of the entire

tumour, the proposal could not be entertained. The reduced and almost typhoid condition of the patient, the extent of the scrotal covering, and especially the extraordinary size and number of the veins imbedded in the wall of the sac, and the firm and universal adhesion of the sac to the skin, quite precluded it. Had it been attempted, I am convinced, the issue would have been immediately fatal. We therefore contented ourselves with making a counter-opening at the lower part, for the further drain of the contents.

After all this had been done, so firm and solid was the wall of the cavity, that it collapsed but little, and large masses of coagula of various degrees of solidity remained within it, adhering to its inner surface. A poultice was then applied. I need hardly add, that the testis was left at the lower end of the tumour, lying unmolested in its natural coverings.

Four days afterwards, Mr. Paget writes, "I saw our patient with hæmatocele to day. He seems much altered in appearance since Thursday, is reported to have had much pain and faintness for some hours after we left, followed by vomiting or rather eructation of fluid, so that scarcely any nourishment has been retained. There has also been profuse sweating; breathing hurried; tongue loaded, dark, and dry. I removed more putrid coagula and sanious fluid, and flatus escaped the while." As was to be expected, he did not survive more than another day.

It is to be regretted, that owing to the offensive nature of the disease, the relatives had the body buried on the following day, so that an application for a post-mortem examination made that evening proved too late. But however desirable a more exact inspection might have been, it could hardly have thrown much additional light on the nature of the tumour, already rendered probable by the clearly recounted history of its origin and progress, and I think quite certainly ascertained during the operation last performed.

I have been at some pains to discover cases analogous to that which I have thus imperfectly related; but the only ones I have met with, seeming to correspond with it in even the leading particulars, are two given by Mr. White in his well-

known 'Cases in Surgery' (pp. 31 and 35). One of these occurred to himself and one to his father. The subjects were both old men, and had borne their disease for twenty years; when suppuration happened, a large quantity of reddish matter and blood, with "putrid flesh," thought to be the degenerated testis, but very probably old masses of fibrin, were discharged. The tumour in both cases reached to the knees, and was successfully extirpated even at the last critical period, and the patients recovered completely. These remarkable cases may be most reasonably regarded as examples of hæmatocele, though the condition of the parts is not detailed with sufficient accuracy to enable us to decide whether the collection of blood was in the cord or tunica vaginalis. From the circumstance of a large inguinal hernia having existed on the same side as the tumour in the former of these cases, it was probably a hæmatocele of the tunica vaginalis, while the history of the latter has a nearer resemblance to the one which I have above given.

I have stated, that Sir Astley Cooper makes no allusion to hæmatocele of the spermatic cord. There is, however, a most interesting case recorded in his great work (p. 210), which presents some points of similarity to this form of hæmatocele, and to which I may briefly refer. The case in question was that of a gentleman, who had a "pyriform swelling of the scrotum, as large as the double fist. It had existed seventeen years, had not been attended with any pain, and its size and weight were the only inconveniences it produced. Its origin was attributed to a blow in hunting, from the pommel of the saddle, which gave him great pain for a short time. The testis and epididymis could be felt at the lower part of the swelling, and above it, to the ring, a solid substance united with a fluid, could be perceived. It was not the least transparent, and he had never suffered pain in it." The swelling was opened by Sir Astley, and discharged a coffee-coloured fluid blood and solid substance of a brownish yellow colour. "The tunica vaginalis," he proceeds, "was excessively thickened, looking like the densest parchment." After hemorrhage, followed by suppuration of the sac, with much constitutional disturbance, this patient recovered.

It may perhaps be safely concluded, that this was not a hæmatocele of the tunica vaginalis, inasmuch as the testis and epididymis could be felt at the lower part of the swelling, and the tumour was placed above these parts, between them and the ring. In hæmatocele of the tunica vaginalis, the blood envelopes the testis, as the fluid of a hydrocele does, and when the sac becomes dense and thickened, the gland is, as it were, sunk and buried in the tumour, and in this state has, indeed, not unfrequently been excised, under the erroneous impression that the swelling was one affecting the gland itself.

The collection of blood in this case seems to have been formed in the lower region of the cord, or in the upper part of the epididymis. It did not enter the inguinal canal. Hence it is most reasonable to infer, that the hemorrhage had taken place into the sac of an encysted hydrocele of the cord, situated low down, or into one of those cysts which Mr. Curling has shown to be of common occurrence under the tunica vaginalis covering the head of the epididymis, and which, when distended with aqueous or serous fluid, form the encysted hydrocele of the epididymis.

My friend Mr. Curling has placed at my disposal the following case of hæmatocele of the tunica vaginalis, which, being interesting from the very uncommon size which it attained, and having a connection with the one I have described, may be suitably appended in this place. From both the same practical conclusion may be drawn, viz. that hæmatocele has little tendency to undergo spontaneous cure, and that sooner or later it will probably enlarge and prove fatal. There should, therefore, be not unnecessary delay in carrying out the ordinary practice of laying open the cavity by a free incision, when the persistence of the swelling and other circumstances indicate the presence of extravasated blood.

MR. CURLING'S CASE.

"March 10, 1849.—I was requested by Mr. Pritchett, surgeon, of Limehouse, to visit a gentleman, aged 79, who had

a doubtful tumour of the scrotum. I found the patient in bed, with a scrotal swelling larger than his head, and extending half way down the thighs. When balanced in the hands it weighed heavy. It had an elastic feel, received no impulse on coughing, and was quite opaque. Its upper boundary, which reached as high as the abdominal ring on the left side, was not well defined. The left testicle was not perceptible. The integuments were red and œdematous, and the part was tender when handled. The only history I could obtain was, that a scrotal tumour had existed for many years without anything having been done for it, and that it had increased considerably and become painful during the two preceding days. The old man was unable to pass his water, and the pain was so completely buried in the tumour, that it was impossible to reach it at the navel-like orifice in order to pass a catheter. He was eccentric, and during his long life had never consulted a surgeon before. I concluded that the case was hæmatocele, and though unwilling to interfere with a tumour of so great a size in an old person, the existence of pain and inflammation of the integuments, and the size of the swelling preventing the passage of a catheter, left me no alternative but to operate. I cut gradually down to the sac, and on an opening being made, upwards of three pints of dark grumous fluid gushed out. Numerous particles of cholesterine floated on the surface of the fluid. On enlarging the opening, and passing my finger to the bottom of the sac, I felt several rounded bodies larger than marbles, the nature of which I could not make out, but they were not disturbed. The thickened condition of the sac prevented its collapsing after the operation. The wound was closed, and a catheter introduced into the bladder, and about twenty ounces of urine removed. My assistance was not again required, but I was informed of the patient's death on the 17th, a week after the operation, and was afforded an opportunity of making an examination of the parts. The large sac consisted of a dilated tunica vaginalis, the testicle being situated, as usual, at the back part. The rounded lumps proved to be masses of coagula adherent to the sac."

CASE OF DISARTICULATION

OF THE

LEFT CONDYLE OF THE LOWER JAW,

WITH EXCISION OF NEARLY THE LEFT HALF OF THE BONE, ON ACCOUNT OF A VERY LARGE CARTILAGINOUS TUMOUR GROWING FROM, AND OCCUPYING THE SITE OF ALL THIS PART OF THE BONE, SAVE THE CONDYLE AND NECK.

BY

WILLIAM BEAUMONT,

PROFESSOR OF SURGERY IN THE UNIVERSITY OF TORONTO, CANADA.

Received February 15th.—Read April 23d, 1850.

JAMES M'CUGH, æt. 7, was admitted into the Toronto General Hospital (Canada West), on September 17, 1849, presenting a greatly distorted face. The tumour on his admission extended upwards to the zygoma and molar bone, almost covering the temporo-maxillary articulation; it reached downwards to fully an inch below the angle of the jaw, extending inwards into the mouth as far as the mesial plane, backwards, beyond the ramus of the jaw, and forwards to the posterior bicuspid. It pushed the tongue quite to the right of the mesial plane, concealed the velum, and almost completely filled the isthmus faucium. The molar teeth of the upper jaw were deeply imbedded in the tumour, which kept the mouth at all times open, with a constant dribbling of saliva, the upper and lower incisors not meeting by fully half an inch. The tumour was very prominent, the distance from the angle of the mouth to the lobule of the ear on the left side being $5\frac{1}{2}$ inches, whilst on the right it was but $3\frac{1}{2}$. The tumour was free from pain, and had at all times been so; it was nearly globular in form, and hard as cartilage in every part of its surface, which within the

mouth was covered with mucous membrane, and free from ulceration, whilst the soft parts of the cheek covering it externally, though greatly thinned and stretched, were in no ways involved in the disease, being quite unadherent.

The father and mother of the child stated, that it was only three months since they had first observed the tumour, which was then not larger than a nutmeg, and grew from the outer surface of the horizontal portion of the lower jaw. At the end of two months it had acquired its largest size externally, but during the last month had grown inwards into the mouth, and backwards towards the pharynx. As to an occasional cause, it is said, that he received a blow on the left side of the jaw (from a boy's fist), a few months before the tumour was first observed. On admission he could not speak intelligibly, had been unable to masticate for the two previous months, and swallowed with great difficulty, his food being always fluid or semifluid. He was thin and pale, but his general health otherwise pretty good.

Sept. 25th.—The patient being placed on a table, his head raised, and the left side being held uppermost, I commenced the operation (assisted by my friend, Staff-surgeon Widmer, and other gentlemen attached to the hospital), by making a curved incision (the concavity upwards) extending from the lobule of the ear to the angle of the mouth, by which the whole thickness of the cheek, and the commissure of the lips, were divided, exposing the external surface of the tumour, along the line of incision. After tying the facial artery, I dissected, close from off the tumour, the upper flap, containing the parotid duct and a small part of the gland. I now found the tumour firmly wedged in under the molar bone, between which and the tumour I passed a strong ivory spatula, which using as a lever, I forced the tumour downwards from the molar bone, and having thus put its superior attachment, the temporal muscle, &c., on the stretch, I divided them with a probe-pointed bistoury. I next dissected the under flap from off the lower surface of the tumour, and having passed a scalpel (curved on the flat) along the inner surface of the jaw bone, I separated from it the mylo-hyoid muscle, and other soft

parts near the bicuspids, the anterior of which I drew, and then with a small straight saw, I cut vertically through the outer wall of the jaw, where this tooth had been drawn. The section was at one stroke completed with strong bone forceps, by laying the edge of one blade in the cleft made by the saw, and passing the other blade close along the inner surface of the jaw. A permanent tooth lodged in the body of the bone would have prevented the further progress of the saw. The left half of the jaw, and the tumour could now be forced so far outwards as to draw the latter in a great measure from the cavity of the mouth, but in doing this I broke off the tumour from the condyle and neck, and upper part of the posterior border of the ramus. The internal pterygoid muscle was then easily separated from the surface of the tumour, (for the natural structure of the jaw from a little below its neck had been entirely absorbed as far as the posterior bicuspid, and its place occupied by the cartilaginous deposit forming the tumour,) and after dividing the mucous membrane on the left side, the tongue, the posterior part of the mylo-hyoid muscle, and inferior dental nerve, the tumour came away; I then proceeded to disarticulate the condyle, which being firmly grasped in the forceps, I drew forwards, opened the joint externally by dividing the external lateral ligament and capsule, and with knives, blunt-pointed, and curved on the flat, I cut through the external pterygoid muscle at its insertion, and the capsular ligament all round the condyle, taking care always to keep the edge of the knife scraping against the bone. On removing the condyle I found its cartilage had been absorbed, but the corresponding surface of the inter-articular cartilage was seen quite sound, white, and glistening. Four or five vessels were tied. A large frightful hollow remained where the tumour had been imbedded, at the bottom of which, the internal carotid, but slightly covered, could be felt pulsating, and the internal pterygoid muscle was seen dangling from the projecting pterygoid process. During the operation we were obliged, three or four times, to turn the patient round, so as to place the mouth downwards, in order that the blood

night the less flow down his throat, and interfere with respiration. Three hare-lip pins were used to hold together the edges of the wound, with strips of adhesive plaster between them, over which cold water dressing was applied; and he was ordered Liquoris Opii Sedativi, mx. In half an hour his pulse became 140, and soon 160, but fell in 8 hours to 120 or 130.

26th, (twenty-four hours after the operation.)—His pulse was 128, and he swallowed well his diet of milk and water. He had slept well the greater part of the night, and had suffered very little pain since the operation.

27.—He had slept all night, felt an appetite for his food, and his pulse but 120.

28.—He seemed hardly so well, had slept but little, and the pulse was quicker. I removed all the sutures, and found that union by adhesion had taken place in the whole length of the wound, and that a purulent discharge had commenced from the inner surface of the cheek, and from other parts dissected off the tumour.

30.—He was craving for food, and doing perfectly well.

Oct. 5.—The boy was quite well, and walking about the corridors. All the ligatures had come away, and the cicatrix sound, but the purulent discharge in the mouth had not ceased.

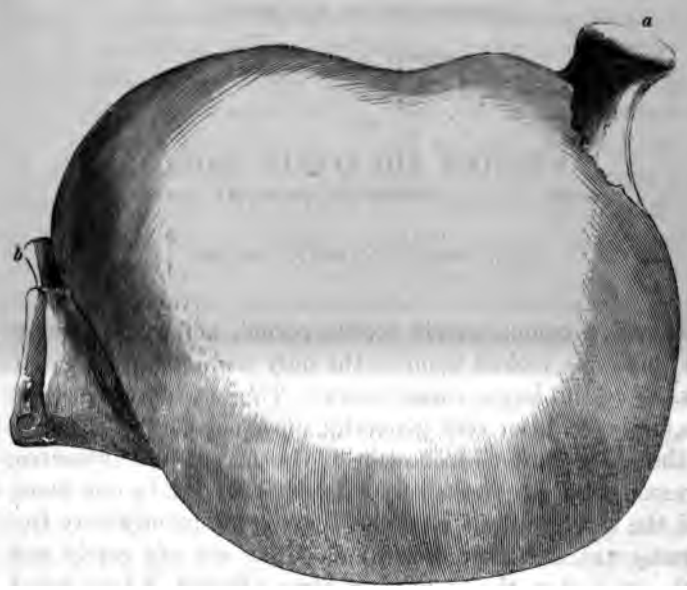
23.—A discharge of saliva had been observed for the last two or three days, from a small fistulous opening in the cheek, through which some ligatures had passed. The discharge was perfectly transparent, colourless, and limpid, like water.

Nov. 9.—The salivary fistula I had left to the vis medicatrix naturæ, and at this time it was perfectly healed. The boy had become much stouter and stronger, and could masticate a crust or a piece of meat without any difficulty. The saliva no longer dribbled from his mouth, his deglutition was unimpaired, and his articulation only slightly affected, which probably arose from the habit of not articulating.

Dec. 1, (ten weeks and a half after the operation.)—A cicatrix could be seen on the inside of the left cheek

near the anterior arch of the velum; the truncated jaw near the left cuspidating, was soundly covered by an investment like mucous membrane; the external cicatrix was a mere line; no vestige remained of the salivary fistula, and the boy was in perfect health. The right half of the lower jaw was drawn a very little towards the left side, about one eighth of an inch,—I suppose by the unopposed action of the right pterygoid muscles. A section of the tumour showed it to be of dense white cartilage, with numerous small particles of bone interspersed everywhere throughout the mass, as though it were undergoing ossification. Not a vestige of the original bone remained within the tumour; the ramus, coronoid process, and body of the bone as far as the posterior bicuspid, having been completely absorbed. One of the effects of the absorption of the normal structure of the bone, and the deposit in its stead of the cartilaginous mass forming the tumour, was the diminished adhesion of the insertion of several muscles, viz. the temporal, the masseter, the internal pterygoid, and the posterior portion of the mylohyoid; so that, in separating these muscles from the tumour, the knife was much less needed than it would have been, had the original bone not been absorbed, for these muscles were but loosely inserted into a membranous covering of the tumour, which appeared clearly to be the original periosteum, as it was continuous with that membrane on the posterior border of the ramus near the neck, and also on the body of the jaw just anterior to the tumour. The periosteum probably separated from the jaw, at the time of the bone's absorption; and from diseased actions of nutrition in the periosteum itself, the large cartilaginous mass forming the tumour, no doubt arose. The condyle and neck of the bone were unchanged, and therefore the insertion of the external pterygoid was firm, the division of which and the ligaments of the joint required the most care, as I had here to guard against wounding the internal maxillary and temporal arteries, neither of which, I think, was cut, as no vessel bled so furiously as either of these arteries would, if opened near the bifurcation of the external carotid. The line of incision through the cheek and com-

missure of the lips, in consequence of the great extensibility of the latter, allowed of the greatest facility in dissecting the soft parts from off the tumour on every side, and also of dividing the jaw at the anterior bicuspid. The line of incision would clearly avoid the parotid duct, but which, in the submaxillary duct, I probably wounded in a subsequent part of the operation, as salivary fistula was evident three or four weeks afterwards, though not till that time suspected.



Size and form of the tumour.

Weight 8 oz. avoirdupois.
Longest diameter $3\frac{4}{10}$ inches.
Shortest diameter $2\frac{8}{10}$ inches.

a. Condyle of the jaw. *b*. Posterior bicuspid.

ON

EXCISION OF THE OS CALCIS,

IN INCURABLE DISEASE OF THAT BONE, AS A SUBSTITUTE FOR AMPUTATION OF THE FOOT.

WITH A CASE.

BY

WILLIAM BOUSFIELD PAGE,

SURGEON TO THE CUMBERLAND INFIRMARY, CARLISLE.

Received February 26th.—Read May 14th, 1850.

UNTIL a comparatively recent period, amputation below the knee was looked upon as the only resource in incurable disease of the larger tarsal bones. This mode of treatment has, however, been very generally superseded by amputation at the ankle-joint. Although in the majority of instances, strumous disease of the tarsus is not confined to one bone, and the results of partial removal are consequently very frequently unsatisfactory, exceptional cases are not rarely met with: and when the os calcis is alone affected, I have failed to discover any valid reason which can be urged against the excision of that bone. When considering the subject in reference to the following case, the only difficulty which at all forcibly presented itself to my mind was the possibility of inflammation, extending from the articulations of the cuboid bone, generally throughout the lesser tarsal joints, and so giving rise in a strumous lad to disease as incurable as that which called for removal. A somewhat similar objection has not unfrequently been made against amputation at the ankle-joint, from the injury which is thereby inflicted

on the lower extremity of the tibia: but the successful result of between thirty and forty cases in the hands of Mr. Syme alone, has proved this fear to be groundless.

At the time I operated on this patient, I was not aware that a similar case had been a short time before subjected to the same treatment by Mr. Hancock: but as its unsuccessful termination prevented any decision being arrived at as to the value of the operation, I am not thereby deterred from bringing the subject under the notice of the Fellows of the Royal Medical-Chirurgical Society, in the hope, that in the hands of other surgeons, exarticulation of the os calcis may be resorted to with results as satisfactory as in the following case.

William G., an unhealthy, ill-nourished, scrofulous boy, 16 years old, was admitted into the Cumberland Infirmary, July 29th, 1848, with disease of the right tarsus, the result of a slight injury he had received several years before. From the time of the accident the foot was swollen and painful, but suppuration and ulceration did not occur until six months before his admission, since which time he has been unable to put the foot to the ground, has suffered much pain, and his health has been greatly impaired. The whole of the back part of the foot was considerably enlarged, and immediately below the inner ankle was an ulcer from which several sinuous passages proceeded to the bone, through which a probe could readily be passed into two distinct parts of the substance of the carious os calcis, one of these being in its anterior extremity. The disease appeared to be altogether confined to that bone. Although it was vain to look for the restoration of the limb to health by any other means than the removal of the affected part, it was advisable, in his debilitated condition, to wait, that he might have all the advantages which were likely to result, from his removal from his own ill-drained and unhealthy home, to the purer atmosphere of the hospital, and a full and nutritious diet.

With rest and nourishing food, and by the administration of cod liver oil, his condition gradually though slowly im-

proved; but his foot, now seldom very painful, manifested no sign of amendment. Further examination served but to confirm the original impression, that the disease was confined to the os calcis, and it therefore seemed desirable, that that bone alone should be removed. As a careful consideration of the anatomical construction of the foot offered me no objection to this, and as I believe that the foot would answer all the purposes of locomotion without it, I determined on its extirpation.

October 9th.—Insensibility having been induced by means of chloroform, an incision, down to the bone in its whole extent, was made from the lower margin of the ulcer, that is, about half an inch below the inner ankle, directly below the sole of the foot, to just below the fibula. This incision would have enabled me to remove the foot at the ankle joint, if the disease of the tarsal bone had proved more general than I anticipated. A careful examination at this period of the operation having determined me to proceed in my original design, the posterior flap was carefully reflected from the surface of the bone, the insertion of the tendo-achilles separated, and the joint between the astragalus and calcanium reached.

By the introduction of a small narrow-bladed scalpel, I succeeded in dividing the ligamentous structures on either side, and also the inter-osseous ligament. This last was the only part of the operation attended with anything like difficulty, forcible depression of the os calcis being necessary to admit of the division of the more distant parts of the inter-osseous ligament, while at the same time great care was required to prevent my injuring the astragalus. I next made two incisions, one on either side of the foot, commencing at the junction of the os calcis with the os cuboides, and ending at the extremities of the first, or transverse incision; dissected, this flap from the under surface of the bone readily separated the connection of the calcanium with the cuboid bone, and after a few touches of the scalpel, the former, with scarcely a particle of soft parts attached, was removed. The astragalus and cuboid bones appeared quite healthy. The two plantar

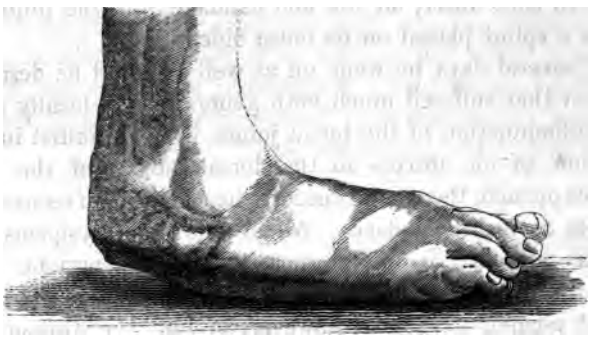
arteries, which had been divided near to their origin, and two or three small vessels in the anterior flap were tied, the parts placed in apposition, and retained by means of strips of lint dipped in cold water, oil silk and bandage, and the limb was laid on a splint placed on its outer side.

For several days he went on as well as could be desired; but after that suffered much both generally and locally from acute inflammation of the tarsal joints, which resulted in the formation of an abscess in the dorsal surface of the foot. This was opened, the wound speedily healed, and no recurrence of a like nature took place. About this time erysipelas and phlebitis attacked in rapid succession every patient with wound in the hospital, and [illegible] under consideration did not escape. Happily, however, in him the disease was confined to the affected limb, and was altogether less severe than in some other cases, although for several days his recovery appeared extremely doubtful. After recovering from this attack, his general health as well as his foot gradually improved, and at the end of the tenth week, the wound was healed, the foot was firm, and in shape not materially different from the other.

He left the hospital January 17, fourteen weeks after the operation. At this time he was able to bear considerable pressure on the heel without suffering, but as I knew that slight injury might lay the foundation of important disease, I forbad him to use the foot, or wear a shoe for several months. This caution appeared the more necessary, as a brother and sister were at this same time under treatment for strumous disease of the bones. At the end of six months he again presented himself with his foot perfectly well, and he was permitted to use it as he thought fit, but from the fear of injuring it, and has he had no proper shoe, he continued to use a crutch for some time.

It is now sixteen months since the operation, and the foot continues sound. When sitting he is able to extend the foot perfectly, and imperfectly when standing, but in walking the spring of the foot is so nearly lost, that he has a slight limping in his gait. He wears a boot in which a piece of cork sup-

plies the place of the lost bone, he can walk, run, and jump, with little impediment: in short, for all the uses of a foot, it is as serviceable to him as the other.



From a cast of the foot a year and eight months after the operation.

Since writing the foregoing, I have been favoured with the particulars of three cases, in which excision of the os calcis has been resorted to in the Newcastle Infirmary, for extensive caries of that bone, the first two cases were under the care of Mr. Greenhow, the last under that of Mr. Potter, and all I am informed have been attended with success, to a greater or less extent. In the first patient the operation was followed by some sloughing of the flaps, but the wound afterwards cicatrized favorably, and when last heard from, the man was following his usual laborious occupation, that of a pitman, in Wales.

In the second case, the patient, also a pitman, from whom portions of the calcanium had been twice previously removed without benefit, the report states, that in less than a month from the date of the removal of the bone, "the wound had almost healed up, and the deformity was not very great." No proper estimate, however, can be formed in this case of the value of the operation, as disease of a similar nature to that in the foot "has since appeared in the hip joint, and is also affected with phthisis."

In the last case, a very scrofulous lad, 15 years old, by trade a tailor, the calcanium was removed entire, and at the same time a part of the surface of the astragalus, which was also diseased, was gouged out; the report states, that "the wound united by the first intention, and the case did exceedingly well; two fistulous sores, however, remained open, and communicated with the diseased astragalus, but he was dismissed two months after the operation, walking on his foot, with a pad in his shoe at the heal."

A CASE OF

STRICTURE OF THE RECTUM,

WHEREIN AN ARTIFICIAL ANUS WAS SUCCESSFULLY ESTABLISHED IN THE LEFT LUMBAR REGION.

BY

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COMMUNICATED BY

BENJAMIN PHILLIPS, F.R.S.

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MR. G. G., aged about 50, director of a college within five miles of Rio de Janeiro, suffered six years ago from piles and fistula, for the latter of which he underwent an operation.

About five years ago, he himself discovered, that he had a stricture of the rectum. Upon examination, his discovery proved to be true. This stricture was treated by bougies, and upon several occasions by free division of the stricture by the knife, but without more than temporary benefit. When I first saw him, two years ago, his suffering had increased, and the stricture was found to be very narrow, with difficulty admitting the point of the finger. The neighbourhood of the anus bore severe traces of the knife. He relates, and the medical man who operated upon him confirms his statement, that when the stricture was divided, it snapped with a noise resembling that produced by the division of a tendon when cut upon the stretch. To the finger the gut feels as hard as cartilage.

It was found impossible to continue the use of instruments either for the purpose of dilatation, or for keeping the stricture

open after division, in consequence of the extreme suffering and constitutional irritation which ensued.

Being thus far acquainted with the history of the case, when I took charge of it, I determined to limit my efforts to the alleviation of his suffering, and to avoid all meddling with the gut, as he could not bear bougies, and after each division the stricture became worse. At times I thought of operating for the formation of artificial anus; but his shattered system, and the damaged condition of his organs, generally dispelled the idea. Thus the chest was found to be duller than natural upon percussion at certain points, and here the respiratory murmur was almost absent, and replaced by a coarse loud respiration, expiration being considerably louder than inspiration. The heart was very easily excited to violent palpitation, and the liver had several times been affected by serious inflammatory disease, and frequently was still the seat of great distress and pain; nor had the kidneys escaped, having at times suffered severely.

Sixteen months ago his suffering having increased, a consultation was held, the result of which was a determination to continue the same palliative treatment.

I then proposed an operation as a last resource, and advised that the descending colon should be opened in the left lumbar region where it is uncovered by peritoneum, and that a permanent artificial anus should be formed; but this proposition received no countenance.

Shortly, in consequence of violent and repeated straining at stool, the bowels ulcerated, and the fæces formed a false passage into the urethra and bladder; so that from this time nearly all the fæces passed through the penis. He had also a narrow stricture, no surgeon having been able to introduce an instrument into the bladder for eighteen years. His sufferings now were much increased. Being able to pass so little at a time, the calls to stool became very frequent, and the matters passed were chiefly thin and bilious, and so acrid, that they quickly inflamed the urethra. At times, bits of bone, which he had unknowingly swallowed, caught in the mucous membrane of the urethra, and obstructing all behind,

occasioned great injury to the membrane and torture to the patient. Frequently they remained several days in the passage, giving rise to increasing distress. The bladder became daily filled with gas, which produced a sensation as if it were about to burst, to the no small suffering of the patient, who could get no relief till, upon evacuating his urine, both escaped together with a loud noise. At times particles of fæces were driven to a considerable distance by the liberated air.

The constant irritation at the seat of disease superinduced attacks of inflammation in the different organs holding nervous communication with it. First the testicles inflamed, and from the necessity of avoiding violent remedies to subdue the disease, they partially suppurated. Next followed, conjointly, inflammation of the liver and kidneys, by which he was brought into a state of such serious exhaustion, that there seemed no chance of life being much extended. Moreover he slowly rallied, but was left in a worse condition than before; there was more urgent suffering, and in addition hectic fever came on every evening, so that his system at last was evidently giving way under such protracted suffering and such an accumulation of disease. Seeing that his death was not distant, unless art could interpose a saving arm, I determined, without any further consultation, to open the descending colon, if, upon explaining the difficulties and dangers of the operation, the patient should desire it; which he most urgently did, and fixed upon the following Sunday, November 4th, 1849, for its performance.

Operation.—Present, Dr. Malet and Dr. Curtis. Dr. Persiani and Dr. Marinho had promised to attend, but were unavoidably prevented. The former, however, saw the patient five days after the operation. Dr. Curtis having administered chloroform, and declared the patient to be fully under its influence, I commenced the operation by an incision beginning immediately underneath the twelfth rib on the left side, and continued down to the crista ilii; this incision corresponded to the outer margin of the quadratus lumborum muscle. I then divided the skin, fat, and superficial fascia. By a few

strokes of the knife, I next divided a fascia and some scattered muscular fibres belonging to the transversalis and oblique abdominal muscles. A dense fascia now presented itself, upon dividing which the outer edge of the quadratus lumborum was clearly seen. Another and another exceedingly dense fascia (the transversalis) was now carefully opened, and divided upon a director upwards and downwards, to the full extent of the external incision. Some loose cellular tissue, forming the anterior layer of the transversalis fascia, having been next cut through without a director, a large quantity of fat was exposed. This having been very carefully removed, layer after layer, the posterior surface of the intestine was at length reached. Having satisfied myself that it was really intestine, I carefully opened it with a scalpel and forceps, to the extent of at least an inch and a half. Four sutures were now applied to the margins of the open gut to secure them to the skin,—one at the upper extremity of the incision, one below, and one at each side, so that the bowel was made to gape, and a spectator (without touching the patient) could easily see the interior of it. Only one artery required ligature.

On the following day, the pressure from within had caused the lower portion of the gut to protrude slightly between the edges of the wound, and still continues there. This was a great advantage, as it effectually prevented any wind or fæces from passing down to the lower part of the gut, and entering the strictured bowel.

The gut united in its new position by the first intention to the parts with which it had recently been brought into contact; a small quantity of pus was formed at the upper end of the wound only.

Within three days after the operation, the hectic fever ceased, although the pulse continued to beat 125 times in a minute. A fortnight after it was reduced to 100, and it is now (seven weeks after) 78. The patient's appearance is very much improved, having acquired a considerable increase in flesh. He is entirely relieved of his sufferings, and walks about with ease. For the first three or four days, the urine passed entirely through the anus; it then began to come

through the urethra, but mixed with a large quantity of pus, which however has been gradually diminishing, and is now scarcely anything. The urine at times has passed up the bowel and escaped at the wound.

If the operation just described, which is that of Callisen, can be shown to be the best for the formation of artificial anus, in cases requiring it, and that when properly performed, it is attended with but little immediate danger, it will be at once conceded, that it has not been had recourse to so frequently as circumstances demanded. Amussat has established, beyond doubt, its claims as a regular operation of surgery, and is entitled to as much honour as if he had been the original proposer.

The difficulties of the operation have been very much exaggerated. I believe the intestine will always be readily found by an incision made along the outer edge of the quadratus lumborum muscle and carried straight forwards, taking especial care that the deepening of the wound incline rather internally than externally, as the intestine frequently lies somewhat concealed by the muscle. The operator must not be disconcerted by having to wade through a large quantity of fat, after dividing completely the abdominal parietes, and before reaching the intestine. This fat moves in and out of the wound with every expiration and inspiration. In the foregoing case, when the bowel was cleared of the fat covering it, it appeared of a grayish colour, loosely bulging into the bottom of the wound, flaccid, and could easily be taken hold of between the finger and thumb, imparting the feel of a double intestine, which was accordingly opened.

I much prefer the vertical to the transverse incision recommended by M. Amussat, and I think it will less frequently lead to difficulty in finding the intestine, or danger of opening the peritoneum; as by the former we are brought down directly upon the intestine, if we take care to incline our cutting rather internal than external to the outer margin of the quadratus lumborum muscle. If the subject were fat, a crucial incision would be requisite.

As to the dangers of the operation, they are but few, and only those which are common to the most trifling wounds, viz. common and erysipelatous inflammation and deep suppuration. These occurrences probably would not often destroy life. Even in the shattered frame upon which I operated, the intestine united readily with the parts in contact with which it had recently been brought. Only a few drops of pus were formed. I would have recourse to this operation in every case of stricture of the rectum (not curable by the use of the bougies), which produced severe suffering to the patient, prevented him following the ordinary avocations of life, or which was beginning to destroy the health, undermine the constitution, or to set up irritation in the different organs holding nervous communication with the seat of disease, as the liver, kidneys, testicles, &c. &c.

ON THE

USE OF THE SPECULUM

IN THE

DIAGNOSIS AND TREATMENT OF UTERINE DISEASES.

BY

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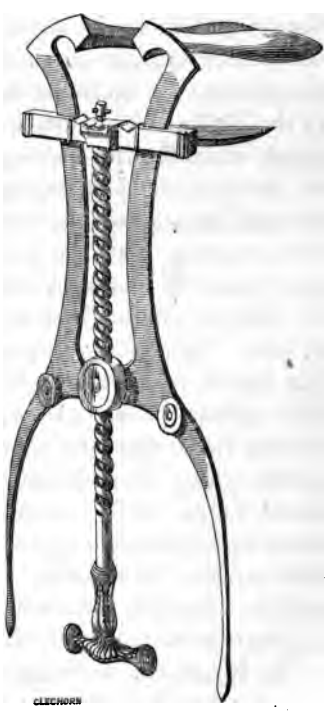
THE *speculum matricis* is said by Ætius to have been invented in the days of the Emperor Domitian, but it must have been known to the Romans at an earlier period. In 1818 a bronze instrument, consisting of three branches, with two handles and a screw in the centre, was dug out of the Ruins of Pompeii, and has been preserved in the Museum at Naples, and of which there is a description and delineation in Vulpes's work entitled 'Illustrazione di Tutti gli Strumenti Chirurgici,' Napoli 1847, from which the accompanying figure has been taken.



This instrument is called, *Speculum magnum matricis*, and there can be no doubt that it was intended to dilate

the vagina and bring the os uteri into view. It is a complicated machine, but probably one of the most safe and perfect trivalve speculums that has since been invented.

Paulus Ægineta described an instrument which he called *διοπτερα*, composed of two branches and a screw handle, which was employed for the purpose of dilating the vagina. Avicenna is stated to have described, under the title *vertigo*, two sorts of specula with three branches, which were opened by means of a screw handle. Spachius has given four delineations of the uterine specula of Ambrose Parè, which had three branches, and were expanded by means of a screw. These instruments are figured and described in chapter xii, which is entitled 'De Verrucarum Cervicis Uteri Curatione.' The following passage contains an account of the diseases to which it was considered applicable: "Quæ in uteri cervice succrescant verrucæ, siquidem minime malignæ sint, filo constringendæ erunt aut exsecandæ. Quæ altius in utero delitescent, speculo matricis immisso, oculis et digitis venient subjiciendæ." Spachius has likewise given a representation of the Vertigo of Albucasis; and it is probable that the instrument, being described along with others which were employed for the purpose of extracting the fœtus when dead, in difficult labours, that it was not used as a speculum uteri, but dilator of the vagina. That the speculum matricis of Joannes Ruffius, also figured by Spachius, was a midwifery instrument employed in difficult labours, is certain from the following passage at p. 179: "Apertorium inquam, unctum et compressum obstetrix leniter per collum matricis ad portam interiorem dirigat: quo sufficienter facto, utraque manu apertorium infra comprimat donec quantum sufficit os matricis diduxerit. Vel si placet altero instrumento speculo inquam matricis, eodem modo utatur, uti de apertorio modo dictu est. In hoc autem vertebram toties circumvolvi oportet donec sufficere propter dilatationem intellexeris. Eo autem modo diducto matricis orificio, obstetrix manibus infantem leniter apprehendat et si possibile est cum secundis educat."

M. Recamier, of Paris, states, that in 1801 he began to treat ulcers of the uterus and vagina with topical applications

like those of the throat. By means of a slender tin tube, five inches long, he applied to the ulcerated surfaces charpie steeped in *mel rosarum*, and certain vegetable syrups with or without the collyrium of Lanfranc, the laudanum of Rousseau, and the extract of opium. "I owed to these dressings," said M. Recamier, "the amelioration of all the ulcers of the uterus and vagina to which they were applied, the prolongation of the lives of several women afflicted with uterine and vaginal cancers, and finally the cure of divers obstinate ulcerations which were not cancerous." [1] How the application of such simple substances as honey of roses, and syrup of carrots, could have produced such striking effects, it is difficult to imagine.

In the year 1816 a case of cancer uteri occurred, which led M. Recamier to enlarge the diameter of his conical tube, that the morbid parts might be rendered more visible, and cauterization employed without compromising the surrounding structures. He called this tube the speculum uteri, which he says has now passed into general practice, to perfect the diagnosis of ulcers of the uterus and rectum, which is indispensable in all cases where dressings require to be applied to the os uteri, and where vesico-vaginal, and recto-vaginal fistulæ exist. At that time it was an opinion entertained by some French pathologists that cancer of the uterus is a local disease produced by, or in some way connected with, inflammation, and that the tissue of the uterus was almost always healthy two or three lines beyond the part affected; that there was an analogy between *noli me tangere* of the skin and cancereous ulceration of the uterus, and that this latter disease might be arrested by escharotics applied over the whole extent of the ulcerated surface. The unsoundness of these views was demonstrated by the result of the first case in which it was tried, the malignant disease having returned again and again; and at last, having proved fatal, though the fungoid tumour of the os uteri had been cut away by Baron Dupuytren in the first stage of the disease, and the

[1] Recherches sur le Traitement du Cancer. Par J. C. Recamier, M.D., tom. i, p. 317.—Paris, 1829.

entire os and cervix uteri, and a great part of the body of the uterus, had been destroyed, not by cancerous ulceration, but by twenty-seven cauterizations made with the acid nitrate of mercury.

From 1816 to 1829, M. Recamier employed escharotics in many cases of cancer uteri, by means of the speculum. In several of these, he said, the disease had never returned, but he admitted that in all, where the cervix was affected with cancer, the disease had never failed to reappear, and prove fatal whatever care was taken to carry the caustic beyond the diseased part. Although the total inefficacy of this treatment was soon satisfactorily proved, it continued nevertheless to be extensively employed in Paris; and not only were arsenical paste, nitrate of silver, acid, nitrate of mercury, potassa fusa, creosote, muriate of gold, and compression had recourse to, but even irons of a red and white heat were applied to the parts, which destroyed their vitality and made them slough; yet, incredible as it may appear, the sensations produced by the actual cautery were reported by the patients to have been rather pleasant than painful.

The cruel practice of extirpating with the knife the whole or portions of the cancerous, or rather supposed cancerous uterus, now began to prevail, and became, both in Paris and London, the source of great popularity to some individuals, and most flattering reports of the results were published. In the Memoir on 'Amputation of the Neck of the Uterus,' presented by Mons. Lisfranc to the Institute of France in 1834, the author stated, that of 99 operations for cancer of the uterus, 84 had been successful. The statements made in this Memoir are now universally disbelieved, and no man possessed of sound pathological knowledge would, at the present time, propose to extirpate the whole or any portion of a cancerous uterus. In the hands of M. Recamier and M. Lisfranc the speculum led only to useless cauterizations and operations.

The instrument soon assumed a great variety of forms, and came to be extensively employed in the investigation of venereal diseases, in the prisons, hospitals, and dispensaries of

Paris. "Inflammation of the mucous membrane of the vagina and os and cervix uteri," "engorgements," "abrasions," "erosions," "superficial ulcerations," "syphilitic chancres," "fleshy pimples," "vegetations," "granulations in groups," "mucous tubercles," "crowds of red papillæ," "projecting spots of varying size," and numerous other morbid appearances, very vaguely defined, were reported to have been discovered by the aid of the speculum, which otherwise must have escaped detection.[1]

The speculum then became an instrument of police, and the sanatory laws not only of Paris but of Berlin, Hamburgh, Munich, Stuttgardt, and other continental cities, were regulated, to a great extent, by the information thus supposed to have been obtained. The prostitutes of the various districts of Paris were then, as now, compelled by the Police to assemble at stated periods in the mornings, at the hospitals and dispensaries appointed by the government, to be examined with the speculum. One by one in succession they took their places upon their backs, with their knees drawn up and separated, on a kind of bed or table, minutely described by M. Parent Duchatelet in his work on 'Prostitution in Paris;' had the speculum introduced into the vagina, and the parts publicly explored by the medical officers of the institution before students and strangers from foreign countries, some of whom took up the notion, that uterine pathology could only be learned by witnessing such exhibitions, and hurried home to announce to their unenlightened professional brethren, that they were the "apostles of the speculum"—that "their fate was linked to the speculum"—and that "with the speculum they would stand or fall."[2] According to the observations made on these occasions, the women thus publicly exposed to shame were either permitted to return to their vicious habits without control, or be consigned to the wards of syphilitic hospitals, which M. Ricord says they

[1] Mémoire sur quelques Faits observés à l'Hôpital des Vénériens. Par M. T. Ricord, D.M.P.; Mémoires de l'Académie Royale de Médecine, tom. ii, p. 159, 1833.

[2] See Dr. Balbrinie's Thesis.—London, 1836.

looked upon as prisons, and to escape from which they practised every species of deceit. Some of the most eminent surgeons of France and Germany conducted these public examinations of prostitutes with the speculum, and endeavoured to perform the difficult task of separating the clean from the unclean.

In the communication which I have now the honour of presenting to the Royal Medical and Chirurgical Society, I propose to state concisely the results of my observations during the last twenty-three years, on the Use of the Speculum in the Diagnosis and Treatment of Uterine Diseases, believing that, at the present time, it is equally important to the medical profession and to society at large, that the *legitimate* use and *real* value of the speculum in practice should be accurately defined and made known.

In the first great class of organic uterine diseases, which comprehends fibrous, fibro-cystic, glandular, and all other tumours which are not malignant, I have derived little or no aid from the speculum in their diagnosis or treatment. When fibrous and other tumours are formed under the peritoneum, or between the muscular fibres, or under the lining membrane and distend the cavity, their existence can only be determined by a careful examination of the hypogastrium, and of the interior of the pelvis through the vagina and rectum. The uterus is usually felt large, hard, irregular, and the cervix shortened. Where these tumours have passed partially or completely through the os uteri, there size, density, the length and thickness of their roots, and the relations these bear to the os and cervix uteri, can only be determined by the touch. I have never detected a small polypus within the os uteri, or hanging through it, which I had failed to detect with the finger. In cases of this description I have, however, repeatedly employed the speculum to ascertain the colour of the polypus, and the degree of vascularity of the investing membrane, which without ocular examination could not have been determined. The knowledge thus acquired was of no use in the treatment. In a case of fibro-

cystic polypus of the uterus, which occurred at St. George's Hospital upwards of eight years ago, under the care of Mr. Cutler, the speculum was introduced, and we saw clearly the small cysts under the vascular covering membrane. The speculum was withdrawn, before the operation for the removal of the tumour had commenced. In a case of small glandular polypus in a sterile married lady, which I saw with Mr. Painter, the speculum was employed, and it made us acquainted with the colour, and more perfectly with the nature and diminutive size of the disease. The polypus was removed with the forceps, after the speculum had been withdrawn. In a similar case which I saw with Mr. Jonson, of Grosvenor Place, the speculum was employed for the same purpose after the nature of the disease had been satisfactorily ascertained by the touch. The tumour was readily removed with the forceps after the speculum had been withdrawn. Very recently I saw a sterile married lady, with Dr. Meryon, who had a small polypus hanging through the os uteri. In that case the speculum had been employed before the patient came to London, and for that reason alone I had recourse to it. The tumour presented the appearance of a large bean, was of a bright-red colour, like vascular tumours of the meatus urinarius, and bled freely when touched, though the surface was not ulcerated. The length and thickness of the root on which the speculum threw no light, had previously been ascertained with the finger. The forceps was passed through the tube, and the tumour removed; but it is now my conviction, that the peduncle would have been more effectually destroyed, had the forceps been passed up along the fore and middle fingers of the left hand in the usual manner. More recently, with Mr. Henry Charles Johnson, I removed a small polypus, hanging through the os uteri, with the forceps, in a most satisfactory manner, without the speculum altogether. In all large uterine polypi it is obvious that the speculum can be of no use, and that it would not enable us in any case to decide whether a tumour in the vagina was a polypus or an inverted uterus, a small portion only of the lining membrane of the uterus, in either case,

being all that could possibly be presented to the eye. A case of large globular tumour in the vagina, now under the care of Mr. Cathrow, strikingly illustrates the truth of what has now been stated respecting the use of the speculum in the diagnosis of inverted uterus, and fibrous tumours.

In all the varieties of malignant disease of the uterus, scirrhus, fungoid cancer, and corroding or phagedenic ulceration, the speculum has given me no assistance whatever in their diagnosis and treatment, either in the early or in the advanced stages. I have never, in a single instance, failed to determine by the sense of touch, when cancer of the uterus had commenced; but I have repeatedly, after the most careful examination, both with and without the speculum, suspected that it would be developed, when the result proved that my fears were groundless. I am fully satisfied that the speculum does not enable us to decide earlier than the finger that cancer has commenced; and if it did so, as some maintain, and enable us to make applications to the os uteri, which could not be made without, not the slightest advantage would be gained in practice. When cancer of the uterus has advanced to ulceration, the speculum is not only useless, but positively injurious, and ought not to be used. In the year 1827, when I first became acquainted with the speculum, and saw it very frequently employed in a great public institution, a patient with ulcerated carcinoma, speedily died from hemorrhage after the introduction of the bivalve speculum. In cases of ulcerated cancer of the uterus, the best French writers have interdicted its use. "L'état de la matrice elle-même," observes M. Teallier, "interdit quelquefois l'usage du spéculum; les ulcérations saignantes, et profondes du col, son énorme développement, les fongosités qui s'élèvent de sa surface empêchent et rendent même inutile ce moyen d'exploration." M. Pauly gives the same opinion, and relates a case in which the speculum produced extensive laceration of the vagina, and death in two hours.

Several cases of ulcerated carcinoma have come under my observations, in which the speculum and ignorance of uterine pathology appeared to have led to the commission of

the most grievous mistakes. In one of these, even in the last stage, the speculum and caustic had been employed almost daily for months, and hopes held out of recovery, when the patient had only a very short time to live. In another case which I saw with Mr. York, where the os and cervix uteri, and a portion of the vagina, were all extensively disorganized by cancerous ulceration, the speculum and caustic were used, at first daily, and then twice a week for months, by the physician under whose care she came at last, without the slightest benefit. I have seen other cases analogous to these, and several others have been related to me which I had not seen.

From the age of maturity to the middle period of life, the uterus is rarely, seldom at least, comparatively with advanced age, affected with organic disease of any kind. Amenorrhœa, hysteria, dysmenorrhœa, menorrhagia, leucorrhœa, and various nervous affections local and constitutional, are those from which females chiefly suffer before the age of twenty-five or thirty. An examination of the physical condition of the uterus in unmarried women, either with or without the speculum, I have always refused to make, even when requested to do so, unless pain severe and almost constant in the region of the uterus existed, leucorrhœa or hemorrhage, which did not yield to treatment, and where the symptoms did not make me strongly suspect the presence of some displacement or organic disease. In unmarried women, whatever their rank or condition in life may be, the integrity of their structures should not be destroyed with the speculum, nor their modesty wounded by an examination of any kind without a necessity for such a proceeding being clearly shown. Even in married women, who are barren, or who have had children, it is unjustifiable on the grounds of propriety and morality, to institute an examination of any sort, unless the symptoms warrant the supposition, that the uterus is displaced, or is in a morbid condition, the nature of which cannot be determined by the symptoms alone. Numerous cases of leucorrhœa in young unmarried females where

rational constitutional and local treatment is adopted, perfectly recover, where no examination is made.

In cases of obstinate leucorrhœa, I have often employed the speculum in married women after I had failed to detect the existence of disease by the ordinary mode of examination. In some of these cases, there has been seen an unusual degree of redness of the os uteri, sometimes affecting the whole, and at other times limited to the inner margin, with or without swelling. The white viscid discharge has been seen issuing from the os uteri. I have never seen ulceration of the orifice of the uterus in such a case, and the condition of the interior of the cervix I have never been able to demonstrate, either with the bivalve or any other speculum; nor do I believe that, in the ordinary condition of the os uteri, it is possible to see the inner surface of the cervix to any great extent by any means. Where the orifice is unusually open, the lips may be separated sometimes to a small extent; but never, as far as my observation goes, to show more than an extremely small part of the interior of the cervix. In some cases of chronic leucorrhœa, with redness and swelling of the os uteri, I have known the speculum and caustic employed at short intervals for many months without the slightest benefit, but the leucorrhœa has ceased, as the general health has been restored by constitutional and topical treatment. In a case of sterility with obstinate leucorrhœa, which has very recently occurred, the injection into the cavity of the uterus of a weak solution of sulphate of zinc, caused the most sudden and excruciating pain, and collapse of the nervous system, which had nearly proved fatal.

Sometimes one or both lips of the os uteri are in the condition which is usually called hypertrophy, and which has no relation to cancer. One lip perfectly smooth, and not unusually hard or irregular, as in cancer, protrudes beyond the other to the extent of half an inch, or three quarters, or more. I have known this state mistaken for polypus, seized with the forceps, dragged down to the orifice of the vagina, and removed with the knife or scissors. At other times both the lips are swollen, nodulated and fissured, and the mucous

membrane covering them intensely red, with an appearance of superficial excoriations or granulations, which are elevated above the surrounding surface. These apparent granulations are usually considered and treated as ulcers of the os and cervix uteri, but they do not present the appearances which ulcers present on the surface of the body, or in the mucous membranes lining the viscera, and they are not identical with the granulations which fill up healthy ulcers. They present the appearances often observed on the tonsils, and which are said to be ulcers, but which are not. This granular state of the os uteri, in which the diseased mucous membrane is raised above the level of the surrounding surface, and not depressed like ulcerations in all other parts of the body, is not dissimilar to granular disease of the mucous membrane of the eyelids, the most aggravated cases of which are well known to be produced by the abuse of escharotic applications. These morbid states of the os uteri most frequently indicate the existence of some disease of the nabothean glands, penniform rugæ, lining membrane or walls of the uterus, or of the general health, which lies far beyond the reach of the speculum and caustic. The state of the orifice of the urethra not unfrequently indicates the existence of disease of the prostate gland, or of the urethra itself near the bladder. Such is the case with the os uteri, and its red swollen hypertrophied, granular state, often indicates morbid conditions of the constitution, of the glands, mucous membrane, and walls of the uterus, on the nature, diagnosis, and treatment of which, little or no information is derived from the use of the speculum. In these cases, I have known leeches, scarifications, caustic, and the speculum employed upon a great scale, and sometimes I admit (if the reports of patients are always to be trusted to), with apparent temporary relief. Gently rubbing the os uteri with lunar caustic through the speculum, a few times at long intervals has appeared to effect all the good which such local treatment can accomplish. It is impossible that any disease of the os uteri, or any other part of the body, can require twice or thrice a week for six or nine months, the alternate applications of leeches and caustic through the speculum, in the

manner which has recently been recommended and practised; and it is my conviction, that rational constitutional treatment and injections, sedative and astringent, will in these morbid conditions of the os uteri succeed ultimately in producing more successful results than escharotics.

In some of these cases, instead of adopting the course which I have now recommended, for the removal of these diseased states of the uterus, potassa fusa has been applied to the os and cervix uteri, a piece of potassa fusa has been run into the cervix and twisted about in all directions, which has produced sloughing and complete disorganization of the parts. In one case, which I saw in a young married lady, this had been done repeatedly, and the patient had nearly perished from peritonitis and the sloughing which followed. I saw this lady some months after, with her general health deeply injured, the lips of the os uteri partially gone, and the parts cicatrized and contracted. I sought in vain for an explanation of the grounds of such practice, and recommended greater caution in the use of potassa fusa; but the advice was thrown away. Twice since the same experiment has been repeated by the same individual, and with the same results. One of the most learned Fellows of this Society has communicated to me the history of a case which came under his observation, in which sloughing followed the application of potassa fusa to the os uteri. The cervix uteri presented the appearance of a hard, pale, shining cicatrix. A narrow chink only was to be seen, into which a small bougie could not enter. The orifice was greatly contracted, if not absolutely closed. The eminent pathologist who has communicated to me the history of this case has justly observed, "That if potassa fusa be introduced into the os and cervix uteri, and turned firmly round, or be applied severely, as has lately been recommended, there must be a partial death and destruction of the part, and a state of actual mortification or gangrene induced; and this injury nature can only repair by sloughing, ulceration, cicatrization, and contraction, if not a complete closure of the cervix uteri."

An English physician, eminent in science, after visiting an hospital in Paris, a few days ago, wrote as follows to a

friend in London:—"I have seen some very wonderful things which I will recount to you; a large speculum being passed up to the neck of the uterus, red hot irons are inserted into the neck, right into the os, which is also cauterized on its surface, and as soon as it is done the creatures get up and walk away, and never seem to feel it at all. To-day M. —— found an os wider open than it should be, and so to satisfy his curiosity, he poked an immense long pair of forceps almost three inches into the cavity of the uterus: yet more, some days ago, I saw him pass his stick of lunar caustic into the os, a little way into the neck, then break it off and leave it there." If such practices as these, here described, were only employed in Paris, from whence all the pretended recent improvements in uterine pathology and therapeutics have issued, I should not now have considered it necessary to denounce them to the Royal Medical and Chirurgical Society.

In the year 1832 my colleagues at the St. Marylebone Infirmary, Dr. Hope, Dr. Sims, Mr. Stafford, and Mr. Perry, late secretary to this society, at my request, desired that the uteri of all the women who died in the wards, should be carefully examined, and that they should be preserved for my inspection when any morbid appearance was observed. "From 1017 post-mortem examinations of females, of all ages, made by Dr. Boyd (after excluding those of children and others, in which special mention is not made of the uterus), there were found 708 where either the state or weight of the uterus was noted. In 13 of these there was congestion or inflammation, which had no specific character, and in some the inflammation was limited to the fundus, and could not have been detected, unless the uterus had been removed or cut open. In at least 3 there was enlargement and induration, which did not appear to have any specific character, and in 2 there was extreme wasting; 24 were puerperal cases; 13 dropsy of the ovaries or Fallopian tubes; in 31 fibrous or bony tumours; and in 21 cancer." "My impression is," adds Dr. Boyd, in the same report, "that ulceration of the neck or the mouth of the womb is an exceedingly rare disease, else I must have observed it,

having cut up and weighed many hundreds, it could have scarcely escaped my notice."

Dr. Allen, the present resident medical officer at the St. Marylebone Infirmary, has held the office about twelve years, and he states to me, that he has actually examined or been present at the examination of the bodies of more than 1000 adult females, and "of these he does not believe, that he ever saw more than 20 examples of ulceration of the os uteri of any kind, scrofulous or venereal, excluding cases of ulcerated cancer of the uterus, which were known to exist before death." Dr. Allen further states, that he has "observed in some cases, a portion of the mucous membrane of one lip slightly abraded, this he has seen occasionally, but not often."

Mr. Prescott Hewett (a great part of whose professional education was received in Paris, and who, for some years, followed the practice of the several professors who were in the habit of exhibiting to their pupils all the appearances which the os uteri presented, through the speculum,) was six years Curator of the Museum of St. George's Hospital, and conducted all the post-mortem examinations. He states that during that time he could not have examined fewer than 600 uteri, "and very seldom, if ever, did he meet with anything which could be called ulceration of the os and cervix uteri, independent of scrofula and cancer."

Mr. George Pollock held the same office for three years, during which time he examined the bodies of more than 300 women, and in every case the uterus was cut open and examined. In 4 uteri ulceration was observed, but 3 of these were scrofulous patients, and scrofulous ulceration existed in other organs. In the 4th case the ulceration must have been cancerous, as it involved the vagina extensively as well as the os uteri. Mr. Hewett and Mr. Pollock did not therefore observe a single example of simple ulceration of the os and cervix in the 900 uteri they examined, which confirms the accuracy of the opinion given by Dr. Boyd, that "ulceration of the neck or mouth of the womb is a very rare disease."

Mr. Gray succeeded Mr. Pollock at St. George's Hospital, and he examined 180 uteri. Distinct ulceration of the os

and cervix was only observed by him in three uteri, and the nature of the ulceration in those three cases was not determined with certainty. Mr. Gray states to me further, that redness, slight abrasions, and granulations were sometimes, but not frequently, observed.

Neither in the living nor in the dead body have I ever seen ulceration of the os and cervix uteri except of a SPECIFIC character, and especially scrofulous and cancerous; but I have met with a very considerable number of cases, in which it had been affirmed by others to exist during life after deliberate and repeated examination by them with the speculum, where I ascertained, that ulceration did not exist in the os and cervix uteri, nor disease of any kind. This mistake has happened not once, and to one individual, but in a number of cases, and to several practitioners who avow that they are "in the daily and almost hourly use of the speculum."

Two years ago, I saw a young unmarried lady suffering from hysteria. She had been examined with the speculum by a practitioner previously in attendance, and was declared to have an engorgement of the uterus and ulceration of the cervix. The speculum and caustic, twice a week for several months, were required, it was said, to complete the cure. At the request of the ordinary medical attendant of the family, I examined the os uteri both with and without the speculum, and he did the same most carefully, but no trace of ulceration or disease of any kind could be detected in the parts. We recommended that the patient should leave her couch, to which she had been doomed, and by the use of valerian, and other appropriate remedies, with exercise and sea-air, she speedily and most completely recovered without the speculum and caustic.

On the 3d October, 1849, I was consulted by a lady, aged 20, who had enjoyed good health before her marriage. Soon after this, pregnancy took place; and for ten weeks, according to her own report, she was extremely ill, had constant sickness, pain in the region of the uterus, and in the legs; swimming in the head, inability to walk,—the whole nervous system was greatly disordered. Miscarriage took place in May 1848, about the tenth week, with much hemorrhage.

I was requested by the patient's mother to examine the uterus, and to state whether it was in a sound or diseased condition. I did so by the touch, and ascertained that it was small, moveable, and neither displaced nor diseased, but very tender on pressure about the cervix. I was then requested to examine carefully with the speculum, and state whether or not ulceration existed in the mouth and neck of the womb, and whether one of the ovaria was not diseased. I did so, but could see nothing like an ulcer in these parts. I was then informed, that she had been examined by another physician with the speculum the day before, and that he had declared, in the most positive manner, that ulceration existed, which would render it necessary for the patient to remain several months in London to have caustic frequently applied. I recommended her to return home immediately, to avoid the speculum and caustic, and trust her recovery to sea-air, carriage exercise, sedatives, and mild tonics. For some months the pains in the uterine region, and inability to walk continued; but in the progress of time all the symptoms wholly disappeared, without any other treatment being adopted; pregnancy again took place, she went to the full period, was safely delivered, suckled her child, and is now in the enjoyment of excellent health.

On the 22d February, 1850, at the request of Dr. Page, Physician to St. George's Hospital, I saw a married lady, aged 32, who had suffered severely from hysteria, both before and after her marriage. She was the mother of several healthy children, the youngest being two years of age. The general health was good, the catamenia were regular, there was no leucorrhœa nor sign of uterine disease. This lady was, however, made to believe by a friend, who had herself been treated with the speculum and caustic during some months, that there was something wrong about her womb, and that she must, therefore, consult the practitioner referred to in the last case. The lady did so, and was immediately informed that she was labouring under inflammation and ulceration of the cervix, and that it would be necessary to come to London for six months, at least, be confined to her couch, and have caustic frequently applied through the

speculum. I examined the os and cervix uteri of this patient, both with the finger and the eye, but I could discover no trace of inflammation, ulceration, excoriation, granulation, or disease of any kind whatever. Never in the whole course of my experience had I seen and felt the os and cervix uteri in a more healthy condition.

I will not fatigue the Society by relating the histories of many additional cases, which have come under my observation, in which it had been previously affirmed, after deliberate examination with the speculum, that ulceration of the os and cervix uteri existed, where there was actually no ulceration nor disease of any kind.

Dr. Copland has communicated to me the following history of a remarkable case, in which the speculum was used, in my opinion, contrary to every scientific principle, and with fatal effects:—"A lady, aged 50," says Dr. Copland, "had been several years afflicted with jaundice, and in the latter period of those years became paraplegic. The paraplegia was, to a certain extent, removed, so that she was able to drive out in her carriage. She had consulted several physicians before she came to me, and I had seen her repeatedly during the last few years. She had heard that a physician had cured the wife of a distinguished person of some very serious disease of the womb. When this was related to her, and that it was done in consequence of his employing a new method of examination, and that, by having recourse to this, he had not only cured the lady referred to, but was also better able than any other physician in London to find out the source of all diseases occurring in females, she went and consulted him, and at the same time informed him that she was under my care. This lady begged me to meet this practitioner in consultation, which I did, when he informed me what this new method of examination was. He stated, that from the previous conversation he had had with the patient, he believed that all her illness arose from disease of the uterus, and he wished to demonstrate this with the speculum. To this I answered, that there could be no disease

of the uterus or its appendages, because the uterine functions had been performed regularly up to the age of 49 years, and that she had never complained of leucorrhœa, or of any uneasiness about the uterus. However, he succeeded in recommending, with the concurrence of this lady's married sister, who had accompanied her from the country, that an examination with the speculum should be made. I said it appeared to me wholly unnecessary, but I would leave the patient to her own discretion. The examination was commenced, and I remained some time, but was shocked with the proceedings, for the hymen was unbroken, and the doors were all obliged to be closed to prevent the people in the house from hearing her screams and being alarmed. The examination went on, and after having stopped the greater part of an hour, during which it continued and was not completed, I left. About seven or eight days after this, I was informed, that the paraplegic symptoms, which had previously been much mitigated, had become exasperated, and had extended so as to produce general palsy, and ultimately delirium and coma. She died in eight days after the examination with the speculum, and I requested an examination of the body to be made. This was done in the presence of Dr. King, two surgeons from Woolwich, and myself. The operator with the speculum was also requested to attend, but he did not appear. The spine was opened, and as high as the first and second dorsal vertebra lymph was effused between the membranes, but it was not recent, and was partially converted into a gelatinous adipose substance. But above this, and up as high as the base of the brain, there were indications of recent inflammation, with a copious effusion of coagulated lymph observed. The uterus and all its appendages were perfectly healthy, the os cervix and every part of the uterus was in a sound state, and the vagina also was perfectly healthy except at its orifice, which presented appearances of recent violence. The hymen was completely torn."

These are all the observations which I shall now offer, on the use of the speculum in the diagnosis and treatment of uterine diseases.

SUPPLEMENT TO A PAPER

ON

FIBRO-CALCAREOUS TUMOURS,

AND

POLYPI OF THE UTERUS.

PUBLISHED IN VOLUME XIX OF THE MEDICO-CHIRURGICAL TRANSACTIONS.

BY

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Received April 30th.—Read May 28th, 1850.

In a paper, published in the Nineteenth volume of the Medico-Chirurgical Transactions, I have stated, that when large, "the fibrous tumour of the uterus is often unequal on its surface, being lobulated or divided by deep fissures and arteries, and veins of considerable magnitude can be traced into its substance." Before the publication of this paper, it had been observed by Sir Charles Clarke, that "if coloured injection be thrown into the vessels of the uterus, so as to make the substance of the uterus quite red, none of it passes to the tumour of fleshy tubercle. In the collection of Mr. Abernethy, surgeon to St. Bartholomew's Hospital, there is a very good preparation showing this fact."[1] Very recently an author, who is said to have carefully investigated the structure of fibrous tumours of the uterus, states, that "the veins, although closely collected around the growth, do not appear to enter it." And another still more recent writer asserts, that "no veins are observed in the structure of these

[1] Observations on the Diseases of Females, &c., p. 269. By Charles Mansfield Clarke.—London, 1821.

tumours: they only appear to be collected on their surface where they are large and varicose."[1]

In the Museum of St. George's Hospital, there are various specimens of fibrous tumours of the uterus, in which both the arteries and veins have been injected. From these it is seen, that when the arteries reach the tumour, they do not at once plunge into its substance, but pass into the fissures or grooves on the outer surface of the membrane forming the sheath; and as the arteries run along these fissures between the lobes, small branches are given off to the surrounding parts. Veins of very considerable size are seen passing from the central parts of these tumours to their surface in a winding manner, and gradually enlarging till they terminate in the uterine veins. In these preparations, the veins of fibrous tumours have been filled with injection, thrown into branches ramifying throughout the substance of the tumours, and also from trunks of the uterine veins. I have repeatedly met with coagula of blood, which extended from the uterine veins into the veins of fibrous tumours, by which the continuity of these vessels could be demonstrated, and the course of the circulation of the blood through such tumours clearly determined.

In the same paper I have likewise observed, that "cavities containing a bloody or dark coloured gelatinous fluid are sometimes formed in the central part of the tumour, probably by a process of softening which its substance undergoes." At St. George's Hospital, a few years ago, Mr. Prescott Hewett showed me a specimen of this tumour weighing fifty-four pounds, in the central parts of which there were several large cavities filled with viscid fluid, which had led to the supposition during the life of the patient from whose body it had been removed, that the tumour was ovarian, and indeed even after death it was sent to London as a specimen of disease of the ovary, and the mistake was only discovered when a careful examination of the ovaria was made, and they were both found in a healthy condition. More than twenty years ago

[1] On Tumours of the Uterus, &c., p. 9. By T. Stafford Lee.—London, 1847.

I saw a tumour nearly similar in size and structure, which had been removed during life, by an extensive incision through the abdominal parietes, on the supposition that it was an ovarian cyst. The operation of tapping has been performed in a few cases of the same disease, but in none of these did the fluid in the cavities of fibrous tumours result from inflammation and suppuration.

It has been stated by several recent writers, that fibrous tumours of the uterus inflame and suppurate; but until the occurrence of the following remarkable case of abscess in the centre of a fibrous tumour imbedded in the walls of the uterus, I had never seen an example of this morbid alteration of structure, nor met with any pathologist who had witnessed the phenomenon. If the fact has ever before been observed, I am not aware that it has been distinctly demonstrated, or its importance pointed out in the diagnosis and treatment of the disease.

Mrs. S ——, aged 40 years, married, but never pregnant, came under my care in 1843, when I inferred, from the enlarged and hard state of the body of the uterus, shortening of the cervix, attacks of menorrhagia, and other symptoms, that one or more fibrous tumours existed in the walls of the organ. From that period till the close of 1849, I had frequent opportunities of seeing this patient, and of ascertaining by examination, that the uterus had not increased much in size during the six years that I had watched the progress of the disease.

About the middle of March, 1850, Mrs. S—— was induced to consult another practitioner. She has stated, that six round masses called balls, were prescribed by him for her, one of which she was directed to introduce into the vagina every night at bedtime. After four of these balls had been used, so much tenderness of the parts supervened, that their further use was discontinued. The pain having increased, the same practitioner was requested to visit the patient, and at this interview, according to the report of the patient's sister, he passed an instrument within the parts. At the

time this operation was performed, little or no pain was felt, but soon after acute suffering was experienced in the region of the uterus, and incessant vomiting with fever succeeded. The symptoms having assumed an alarming character, I was requested to see Mrs. S —— on the 15th of April. The pain and vomiting partially ceased after the application of leeches, and other remedies, but the inflammation of the uterus was not arrested, and death took place on the morning of the 18th. The day after, the body was examined by Mr. Wharton Jones and myself. The uterus was about the size of a cricket ball, and hard. The ovaria and fallopian tubes on both sides, and the uterus and rectum, adhered together by old false membranes. Having removed the uterus from the body, an incision was made through its anterior wall, when there flowed out a quantity of greenish yellow fœtid pus. This matter had escaped from an irregular cavity in the centre of a fibrous tumour, which still contained a portion of purulent fluid. The whole lining membrane of the uterus was red and inflamed, and near the cervix appeared softened and disorganized. The anterior lip of the os uteri was of a peculiarly livid colour. The sac of the peritoneum presented no trace of recent inflammation. The cavity in the fibrous tumour from which the pus had escaped is seen in the preparation of the parts, and which is preserved in the Museum of St. George's Hospital.

CASE OF

FATAL POISONING

BY

SIR WILLIAM BURNETT'S FLUID.

BY

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COMMUNICATED BY

T. B. CURLING, Esq.

Received April 9th.—Read June 11th, 1850.

THERE is not, I believe, an account of any fatal case of poisoning by chloride of zinc on record. This fact will appear somewhat remarkable, when we consider that one of our commonest and most accessible deodorizing compounds is a strong solution of this poisonous salt. Moreover a reference to the writings of our leading toxicologists, Orfila, Christison, Devergie, and Taylor, will show that this substance is not even regarded as a possible source of danger to the community. It is true, that the last-named author has incidently mentioned the chloride in his work 'On Poisons;' but the properties of the compound are so briefly disposed of, that few persons would consider it to be a virulent poison; for Mr. Taylor merely says, "this is a very soluble deliquescent salt; the chlorine is detected by nitrate of silver." And Dr. Christison, in alluding to the preparations of zinc, states that, "the only important compound of this metal is the sulphate, or *white vitriol*." In point of fact, we may seek in vain, except in the writings of my most erudite friend Dr. Pereira, for any account of the physiological actions of this mineral: all of which circumstances may, perhaps, give an interest to the following report.

On the morning of Thursday, August 16th, 1849, Mr. Miller, of Eye in Suffolk, was sent for in haste, to visit the child of a poor unmarried woman, named Mary Robinson, who lived at Reddingfield, a neighbouring village. Mr. Miller arrived there between ten and eleven o'clock on the forenoon of the day just named; he found the patient, a little girl aged 15 months, in a semi-comatose state,—the vital powers being much prostrated, the countenance pale and anxious, the breathing thoracic and rapid, the pulse quick and fluttering, and the general surface of the body cold, and bedewed with perspiration. On noticing that the lips were swollen, and that the mouth was covered with a thick transparent mucus, Mr. Miller made further search, and perceived that the inner surface of the lips, and lining membrane of the mouth, presented an opaque white appearance, as if they had been acted on by some caustic or corrosive substance. He learned, moreover, that the child was well and hearty early in the morning, but that it had been suddenly seized, about an hour and a half before his visit, with most violent sickness. These facts led him at once to conclude that the child was suffering from the effects of an irritant poison; and his conclusion was in a great degree verified by the circumstance of one of the attendants producing a bottle of Sir William Burnett's disinfecting fluid. This bottle had, it appears, been supplied by Mr. Miller to the mother of the child about a week or ten days before, when there were some patients affected with fever in the house in which she lived.

When roused from its lethargy, the child craved for cold water, and retained it in its mouth with apparent satisfaction; but, on attempting to swallow the water, the greater portion of it returned by the nostrils. On making a careful examination of the throat, Mr. Miller thought that it was somewhat swollen; and he was led to think, that the child was suffering pain in the part, from the circumstance that it frequently raised both hands to its neck.

Mr. Miller tried in vain to give relief to the poor sufferer. He endeavoured to administer a solution of albumen, but the fauces were so swollen and constricted, that little or none of

the antidote passed into the stomach. He noticed, however, that the white of egg employed was coagulated by the fluid matters which still adhered to the mouth. Occasionally the child vomited a frothy liquid, like curds and whey, and at such times it was aroused from its heavy drowsy state; but gradually the coma became deeper, the respiration slower, the pulse more feeble, the surface of the body colder, and at seven o'clock in the evening the child died; its sufferings having continued during a period of ten hours.

A post-mortem examination was made twenty-two hours after death; the body was plump and well developed; the face was pale and somewhat swollen; the lower lip had a dark brown scab upon it, the effect of the corrosive action of the poison; the lining membrane of the lips, mouth, fauces, and œsophagus were of an opaque white colour; the lungs were slightly congested; the auricles of the heart were full of dark semi-fluid coagula, and the ventricles were empty; the outer surface of the stomach presented a peculiar mottled appearance from ramifications of dark purple vessels; the intestines looked paler than natural. The stomach, which felt hard and leathery, contained one ounce and a half of a fluid that resembled curds and whey; the inner surface of the organ was corrugated, opaque, and tinged of a dull leaden hue: this appearance stopped abruptly at the valve of the pylorus, from which point the rest of the alimentary canal had a natural appearance; the kidneys, however, were greatly congested.

As this case was likely to become the subject of criminal investigation, Mr. Miller, at the request of the magistrate and coroner, brought to me the stomach, together with its contents, and a portion of the vomited matters for analysis.

On examination, I found that the interior of the stomach was only slightly acid to litmus paper; and, on digesting the organ in one ounce of distilled water, I obtained a liquid which gave white precipitates with the following reagents; prussiate of potash, monocarbonate of soda, sulphuretted

hydrogen, and acid nitrate of silver; while it did not furnish a precipitate with a soluble salt of baryta: all of which circumstances clearly indicate that chloride of zinc was present.

The fluid matters taken from the stomach, as well as those ejected by vomiting, exhibited, on being filtered and tested, the same chemical reactions.

Lastly, the tissue of the stomach was broken up with nitro-muriatic acid, the solution evaporated to dryness, redissolved in distilled water, filtered, and precipitated with sulphuretted hydrogen; by which means I obtained 3·8 grs. of sulphuret of zinc, a quantity equal to 3·2 grs. of the oxide, and 5·4 of the chloride of this metal.

On making an analysis of the disinfecting fluid supplied to the mother, I found that it had a density of 1600, that it was slightly acid to litmus paper, and that it contained 52 per cent. of the solid chloride.

Furthermore, I considered it necessary to make a few experiments with the liquid in question, in order to determine its leading chemical and physiological characters; and the following are the results obtained.

I.—WITH REGARD TO THE CHEMICAL PROPERTIES OF SIR WILLIAM BURNETT'S FLUID.

This compound manifests a strong coagulating action on albumen, and on the tissues of the animal body. With a solution of the former, it gives a precipitate or white coagulum, when the saline liquid does not contain more than one part of the solid chloride in 5000 of water; that is, when Sir William Burnett's fluid is diluted with about 2500 parts of water. And if we make use of the undiluted disinfecting fluid, the coagulum, which is at first formed, rapidly dissolves, and produces a solution from which the albumen is again precipitated on adding a large quantity of distilled water. When poured on the dead mucous membrane, this fluid quickly whitens and coagulates the tissue, even when the liquid contains only one per cent. of its saline constituents; that is, when it is diluted with about 50 parts of water; and

a similar coagulation results in the course of five or six minutes, when a liquid of half this strength is used. I have found, moreover, that the compound thus formed with albumen is, to a certain extent, insoluble and indecomposible; for, on digesting the corrugated tissue, or the white coagulum in water for many days, the residue still contains a notable proportion of the metallic chloride. This was proved by taking the stomach of a dog, which had been poisoned with chloride of zinc, and exposing it to the action of a running stream of water for seventy-two hours, after which it was broken up with nitro-sulphuric acid, evaporated to dryness, drenched with a solution of ammonia, filtered, and then precipitated with sulphuretted hydrogen; by which means I obtained 1·3 grs. of sulphuret of zinc. This fact is of some importance in a medico-legal point of view, because it indicates, that the poison may be detected in the tissues of the alimentary canal long after the death and burial of the body.

The quick and, as I may term it, firm coagulating action of the chloride of this metal on liquid albumen, and on the delicate tissues of the body, especially serves to distinguish it from other soluble salts of zinc; for notwithstanding that a small quantity of a strong solution of the sulphate or acetate will slowly act on white of egg or on the dead mucous membrane, yet the reaction is not well marked; and if we employ a weak solution of albumen, the coagulum is instantly dissolved by a very slight excess of the precipitant, a solution being obtained which differs from that of the chloride by its not becoming turbid, when it is diluted with distilled water.

II.—WITH REGARD TO THE PHYSIOLOGICAL PROPERTIES OF THIS COMPOUND.

I may, perhaps, by way of preface, state that I have performed many experiments on living animals with the muriatic solution of different strengths; and although the results have not always terminated in a like fatal manner, yet, the general physiological effects have, in all cases, been so nearly alike

that the record of two or three experiments will be sufficient to illustrate this part of my subject.

In one experiment I took a young terrier puppy, whose respirations were 16 in the minute, and pulse 72. I administered to it, by means of a syringe and œsophagus tube, one fluid ounce of the liquid in question (its sp. gr. being 1600). In one minute the dog vomited, and in so doing brought up the greater part of the chloride, mixed with a little food, which it had taken one hour previously. In the course of four minutes the animal had vomited seven times; and it continued to retch every three or four minutes for the space of half an hour, the matters ejected being at the first watery like mucus, then frothy, and at the last they had the appearance of curds and whey. At the end of the last-named period, the animal appeared to be much exhausted, for it staggered in its walk, and then fell to the ground. At this time its pulse was 110, weak and fluttering; its breathing was laborious, and amounted to twenty respirations in the minute. Soon afterwards the efforts at vomiting were renewed; the animal again rose from the ground, and showed, by its feeble and tottering gait, that the posterior extremities were becoming paralysed; the pupils were now so widely dilated, that the irides were scarcely perceptible. From this time it was again tormented with the most violent retching, and at the termination of the first hour it had vomited nineteen times. Immediately after this, it lay upon the ground perfectly exhausted; its pulse was scarcely perceptible, the breathing had become slower, and more laborious; and, although the animal was quite sensible, yet it was evidently passing into a state of coma. After the lapse of one hour and a half from the first, it was unable to stand, although it frequently tried to do so when the distress of vomiting roused it. At these periods it was sensible, and would look towards me when I called it; in the intervals it appeared to be heavily asleep: gradually, however, the coma became more marked, the surface of the body lost its temperature, the pulse became more and more feeble, the breathing heavy,

slow, and laborious, and in six hours and a half it died, without showing the least sign of convulsions.

The body was examined twenty hours after death. The mucous membrane of the mouth and œsophagus was white and opaque: the stomach was hard, contracted, and empty; its external surface was marked with numerous purple vessels which ran in a longitudinal direction. On opening this organ, its tissues were found to be corrugated and tinged of a dull leaden hue; and on digesting it in water it furnished a solution which contained 6·5 grs. of the chloride. The lungs were not congested; the cavities of the heart were full of black uncoagulated blood, which by treatment with boiling alcohol and water, yielded distinct traces of the poison. The intestines were natural in appearance; the kidneys were much congested; and the urinary bladder was empty.

To a second puppy, a small mongrel terrier, which had been kept without food for twelve hours, I gave half an ounce of the undiluted solution (sp. gr. 1600). Before the experiment was made, its pulse was 70, and its respiration 14, in the minute. In forty-five seconds, the animal vomited, and by so doing threw up the greater portion of the poison. In another minute it was again sick; and in the course of six minutes it had vomited five times, the matters ejected being, as in the last case, frothy and curdled. During the next ten minutes, the dog walked about in a restless, unsteady manner, whining as if it were in pain. At the expiration of that time it lay down and began to appear sleepy; its respirations were then 18 in the minute, and its pulse 114. Two minutes afterwards it rose from the ground, and made slight efforts to vomit. At this time it drew its hind legs heavily along, as if they were becoming paralysed. Soon afterwards the animal was unable to stand, although it made many attempts to do so, and I perceived that it had quite lost the use of the posterior extremities. In twenty minutes from the first it was violently purged; the pupils were largely dilated; the heart was beating feebly, and the respirations were heavy and deep. In thirty-five minutes it appeared to be in great pain, for it rolled itself about and

made a low whining noise. During the next ten minutes it lay as if it were in a deep sleep, and, without being disturbed, it was purged six times. From this period the coma became more and more complete; the respirations heavier and slower; the surface of the body got cold; and at the expiration of the third hour it died without a struggle.

The post-mortem appearances were precisely like those observed in the former case, and the poison was readily detected in the stomach, heart, blood, and muscular tissues of the body. The peritoneum also contained five drachms of a sero-albuminous fluid which yielded 2·3 grs. of chloride of zinc, the poison having transuded the parietes of the stomach and intestines.

In a third experiment, I gave four drachms of the fluid, diluted with half an ounce of water, to a young terrier dog. The contents of the stomach were ejected in one minute; and in the course of the next seven minutes vomiting had occurred eight times, the animal throwing up a frothy mucus mixed with a considerable quantity of food. In fifteen minutes, it began to show signs of approaching coma, for it lay on the ground in a sleepy, heavy condition. At this time its pupils were largely dilated, and its pulse and breathing were slightly accelerated. In the course of the next hour it was roused by its repeated efforts at vomiting: gradually, however, the retching became less and less distressing, and the animal lay in a heavy, comatose state for a period of seven hours, when it woke, but looked ill and uncomfortable. It lay dosing during the next day and a half, and then it began to take food. At this time it passed two or three drachms of urine, which had a density of 1042, and which yielded 1·2 grs. of sulphuret of zinc. From this time the animal gradually recovered.

The experiments here detailed show that a solution of chloride of zinc exerts a two-fold action on the living animal tissues, the first effect being that of an irritant and caustic, and the second coagulates the tissues, occasions pain in the part to which it is applied, and almost instantaneous vomiting.

It appears, moreover, from the investigations of Orfila, that the salts of zinc act upon the stomach not only when they are introduced into this organ, but also when they are injected into the blood-vessels of the body, or applied to a wounded surface. The second effects of the poison are of a constitutional nature; and, although I am not prepared to say what amount of these effects are due to the violent injury inflicted on the mucous and other tissues of the stomach, yet I am of opinion, that the poison exerts a distinct and specific action on the motor and organic systems of nerves; for, as in the case with the sulphate of this metal, soon after the poison gains access to the circulation, the breathing and pulse become accelerated, the hind limbs begin to grow feeble and paralytic, and the pupil of the eye undergoes a remarkable amount of dilatation. From this time the paralysis becomes more and more complete, the surface of the body grows cold, the respirations become deep and laborious, and the pulse gets to be fluttering and then almost imperceptible. As yet, however, the mental functions do not appear to be impaired, for the animal exhibits, when it is roused, all the usual signs of intelligence; but, gradually, as the effects of the poison become more and more developed, coma supervenes, a total prostration of all the vital powers is effected, and death takes place without a struggle. All these results are so similar to the effects observed by Orfila and others in cases of fatal poisoning by the sulphate of this metal, that they must, I think, be regarded as the manifestations of its own peculiar mode of action. Moreover, the experiments of Orfila and Blake have demonstrated, that the very same effects are produced when a salt of zinc is injected into the veins, arteries, or cellular tissue of a living animal; and hence, as Professor Christison remarks, "these experiments, when taken together, show that sulphate of zinc, though a moderately active irritant, is more indebted for its activity to a remote operation on some vital organ," or as Orfila states, that "independently of the local irritating action, which this salt exercises, it appears to act by stupefying the brain."

It is also, perhaps, worthy of remark, that the experiments

which I have made with chloride of zinc, prove that the poison is absorbed from the alimentary canal, and carried into the general circulation; for I have detected the metal in the blood removed from the heart, in the tissues of the body, and in the urine excreted during life. These results are but confirmatory of the observations made by Orfila.

Moreover, the appearances presented by the blood indicate, that the poison exerts some peculiar action on this fluid, for in all the cases hitherto examined, the blood has been found black and uncoagulated, and the cavities of the heart have been filled with the fluid, as if the organ had lost its power of contracting on its contents.

Finally, I ought to mention, that Dr. Strettan has recorded two cases of poisoning by chloride of zinc; in one of which the patient took twelve grs. of the salt, and in the other 200 grs. of it, dissolved in a wine-glassful of water. The symptoms produced were very similar to those herein detailed, though in both instances the patients recovered.

A CASE

IN WHICH THE URACHUS REMAINED OPEN, AND A RING-SHAPED CALCULUS, FORMED UPON A HAIR IN THE BLADDER, WAS EXTRACTED THROUGH THE UMBILICUS.

BY

THOMAS PAGET, F.R.C.S.

SURGEON TO THE LEICESTER INFIRMARY.

COMMUNICATED BY

WILLIAM BOWMAN, F.R.S.

Received May 20th.—Read June 11th, 1850.

The following case excited some interest at the time of its occurrence, and may be acceptable to the Royal Medical and Chirurgical Society. The specimen of calculus I send is the one referred to. It consists of a ring of lithic acid, with a fine hair in its axis; the hair being rendered visible where a projecting end has been broken off. The calculus is about as thick as a medium-sized writing quill, as shown in the subjoined figure. The history of the case is as follows:

John Conquest, ironfounder, æt. 40, has, for the last year or more, suffered from frequent and painful micturition, and on sounding I readily found a calculus. He also mentions, that upon attempting to make water, and during strong efforts at work, a portion of his urine is apt to escape at the navel which is open; and that, as far as he knows, this has been the case with him from birth.

Thus far on his admission to the Leicester Infirmary, August 15th, 1844. On subsequent examination I found

that the nose of the catheter was easily made to appear from the bladder at the umbilical opening; and I hoped the stone, which seemed not a large one, might, without a painful operation, be extracted that way.

Towards this end the most feasible project that occurred was the distension of the bladder to its utmost with warm water, the umbilical aperture being tightly plugged, and the patient reclined upon Heurteloup's table with his head lower than the pelvis, that upon removal of the plug the calculus might flush out with the water. When, however, all was prepared, and the knife for lithotomy at hand, to be used in case of failure by other means, it occurred to me to try first a finger at the umbilicus. It readily entered, and when at full length down the unnatural passage, caught within the circle of the calculus sufficiently to enable me to drag it along the side of the bladder and extract it.

Its annular form of course led to a surmise as to what was the nucleus; and on carefully truncating it, the projecting extremity of the hair was seen. The phenomena connected with the opening at the umbilicus may be thus described.

There is a circular deficiency in the linea alba an inch in diameter, its margin being thickened and of cartilaginous hardness. Through this protrudes a hernia of the size of a goose's egg, which, in lieu of ordinary integument, is covered by mucous membrane, the surface, however, becoming dry when exposed for any length of time, as that of a vagina when inverted by complete prolapse of the uterus.

He never makes his water while the hernia is out; for when called to an effort for that purpose, the first act of the bladder is gradually to draw into the abdomen the whole of the protruded substance; its first contractions have no other effect, and it seems not to have power to force the urethra until that is accomplished. At the latter part of this act, at the instant of the disappearance of the hernia, there occurs a rather forcible jet of urine from the opening. The flow by the urethra also commences at this juncture, and the bladder is emptied in the usual way, the jet from the umbilicus ceasing, not to be renewed except by a violent

accelerating action of the expulsor muscles. He can retain a pint of urine.

By watching the first contractions of the bladder, it becomes evident, that to the thickened margin of the umbilical aperture are attached the muscular fibres of the bladder extended along the urachus; in fact, that the bladder and urachus are formed into a urinary receptacle, which in shape may be compared to a curved necked cupping-glass; the urethra passing out at its lower end, and its mouth being attached by muscle to the circular aperture in the linea alba. It becomes evident, also, that the pouch of the hernia is formed by evasion of the posterior part of the neck only, which is of course attached to the upper half of the aperture, and when protruded, presses upon the hard edge of the lower half sufficiently to prevent the escape of urine, except under straining efforts of the abdominal muscles.

The hernia is generally out; and he wears a girdle with a thick pad of flannel to catch the jets of water which are apt to occur while he is at work.

After the extraction of the calculus, the man was entirely relieved of his bladder symptoms; and as in consultation with my colleague and friend Mr. Nedham, it was thought unadvisable to interfere with the congenital defect, he was in a few days discharged. I saw this man at the end of April 1850. His state then was such as I have above described.

I may, in conclusion, refer to the following extract from Sir Benjamin Brodie's work on 'Diseases of the Urinary Organs,' (4th Edition, 1849, p. 263,) which notices examples of calculi formed on hairs.

"The Museum of St. George's Hospital affords two examples of calculus matter deposited on hairs. The calculi are numerous, of a peculiar oblong figure, from one third of an inch to an inch in length, with the hairs lying longitudinally in them. They are composed chiefly, if not entirely, of the phosphate of lime. One of the patients from whom these were taken was a young married lady, attended first by Mr. Wilson of Manchester, and afterwards by myself;

and in her the origin of them seemed to be from a small congenital ovarian cyst communicating with the bladder. The other patient was an elderly lady, in whom there was no reason to believe that any ovarian disease existed. We know that hairs are occasionally found in other cysts besides those of the ovarium, and they may in this last-mentioned case have been formed in some such cyst in the kidney. I attended a gentleman who laboured under a calculus of the bladder; also under disease of the kidneys, of which last disease he died; and in whose urine I every now and then detected some very minute hairs, which I suspected to have been of renal origin. Unfortunately the body was not examined after death."

I imagine that the hair, in my own case, must have been one of the pubic hairs, which had found its way into the bladder through the umbilical opening.

A CASE OF

ILEUS COMPLICATED BY HERNIA.

BY

SAMUEL SOLLY, F.R.S.

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Received March 12th.—Read June 25th, 1850.

I HAVE ventured to bring the following case before the Society, because it illustrates a class of cases of great practical importance to the surgeon, but of unusual occurrence. Cases of internal strangulation are in themselves unfrequent; and any relation of such cases at the present time must be useful, when surgeons are considering if their operative assistance is justifiable. The account now offered will, I believe, be doubly so, inasmuch as it affords an instance of the internal and external strangulation in the same individual.

The complication masked the symptoms; and if its relation should assist the judgment of any surgeon having a similar case under his care, my object in its detail will be obtained.

The important and valuable paper of Mr. Phillips,[1] on this subject, does not contain a case exactly similar.

On the 27th of February, 1850, at half-past ten, a.m., I was called in great haste to visit a gentleman, who was suffering from pain in the abdomen. He was a clerk in the City, aged 21, a remarkably fine, well-made man. I found him lying on the floor in great agony, complaining of a violent pain in the abdomen.

My friend, Mr. Beale, had arrived there just before; and he called my attention to an inguinal hernia, to which he

[1] Medico-Chirurgical Transactions, vol. XXXI.

had already applied the taxis, but, as he stated, without any effect. The swelling was about the size of two hen's eggs, lying principally in the inguinal canal. The patient complained the rupture was so tender, that he could not bear to have it touched. I did, however, apply the taxis for a few minutes, but soon desisted.

History.—The account which he gave was, that this swelling and pain occurred simultaneously, on going to the water-closet, immediately after breakfast; but I have since received the following history from a gentleman with whom he was living, and who was with him the whole of the morning.

About ten days ago he had obstinate constipation, for which he took some strong aperient medicine, which, when acting, produced a good deal of pain, and left considerable irritation of the bowels, that lasted some days, the evacuations being tinged with blood; but this all passed away, and on the Sunday before the Wednesday on which I first saw him, he took a walk of fifteen miles, without feeling any fatigue. On the Tuesday night he made a full supper of stewed beef; and on the Wednesday morning again eat of the same dish, and so heartily, that he acknowledged to his friend that he had eaten too much.

As he left his home, after breakfast, at half-past eight, a.m., and was descending the steps of his house, he complained to his friend of a violent pain in his belly, having at that time no swelling in the groin; this pain was so severe, that he was obliged to ride up to town. He suffered much all the way up, and by the time he reached the office in Leadenhall Street, he was deadly pale, and his lips blue with pain. On his arrival there, he went to the water-closet, and he passed some fæces, and in doing so the swelling first appeared in the groin. He says it came down without any strain.

Progress of the case.—As the taxis had proved unsuccessful, and the hernia was so very sensitive, we had him removed to

bed; ordered a warm bath, and in the meantime applied ice. In an hour's time I again saw him, the ice had produced no relief, and I again tried the taxis very gently, but without avail. The warm bath was next used, but with the same result. I now determined to operate, just four hours after the descent of the rupture. I divided the external abdominal ring, which was very tight, without opening the sac; but this did not release the intestine, and accordingly I proceeded to open the sac, which was very thin; in it there was found a knuckle of gut, which was forced over the external ring, and was of rather a dark colour, but another portion of intestine at the lower part of the sac was almost healthy. I then divided the internal ring, and returned the intestine without difficulty into the abdomen. The wound was dressed in the usual way, and we ordered Calomel, gr. ij; Pulv. Opii, gr. $\frac{1}{4}$; every two hours.

At 6 p.m. I saw him again. He had been very restless ever since the operation: he complained of very great pain in the abdomen, exactly similar in character, he said, to that he experienced before the operation, and quite as severe: he felt this most at a particular part of the abdomen, not over the wound itself, but in a situation a little above it, and corresponding very accurately with that which the internal constricting bands were found to occupy at the post-mortem examination; he said, also, that he could feel the contents of the bowel stop at this situation. The pulse was soft, and 82; the skin warm. Ordered: Enema, Ol. Ricini, ℥ij; Tr. Opii, ℿx; ex. Decoct. Hordei Statim; Calomel, gr. ij; P. Opii, gr. $\frac{1}{2}$, Statim. Fomentation to the abdomen.

9 p.m. There had been no action of the bowels, but there was less pain in the abdomen. Pulse 90, sharp and wiry. Ordered: Calomel, gr. ij; quâque horâ. Hirudines, xl. Statim. Enema commune unâ horâ postea.

11 p.m. Pulse soft, 100. I administered an enema, which gave him some relief, and brought away some feculent matter; he afterwards expressed himself much easier, and inclined to dose.

1 a.m. He was sleeping quietly. The calomel was ordered to be given if he waked, but he was not to be disturbed for it.

The following is Mr. Beale's report, who saw him first this morning.

"Our patient has passed a tolerably good night. The belly is less tender and tense—the skin moist—the pulse rapid, but more soft, and there is less pain—no evacuation or passage of wind per anum, frequent eructations still. The turpentine enema had not been given. I ordered its administration, and said we should be there at 8."

9 a.m. The countenance was anxious; the eructations frequent, and the nausea great; the pulse very feeble and rapid; no action of the bowels. He said that he was in great pain from inability to pass his water; but would not allow the catheter to be used. Ordered an aperient draught of rhubarb and tartrate of potash.

11 a.m. Much worse. Pulse was scarcely perceptible. Skin cold and clammy. Sent for Mr. Chaldecott to sit by his bed-side, and give him, from time to time, brandy and iced-water by teaspoonfuls. He vomited a considerable quantity of greenish bile, not feculent.

1 p.m. Much worse; extremities cold; pulse scarcely perceptible; rallies a little with brandy, but soon sinks again. Wind and some feculent matter passed per anum. No pain. He remained free from pain up to the time of his death, complaining only of a distressing feeling of weakness. There was no more vomiting; and though there was hiccough occasionally, it was at longer intervals. He took brandy and iced-water by teaspoonfuls, every five or ten minutes, and said that he liked it much.

At $3\frac{1}{2}$ p.m. he had a liquid feculent stool; and soon after this he became still weaker, his pulse being imperceptible at the wrist, and respiration becoming impeded. He recognised his brother, who arrived about this time, and asked after his mother; but he wandered occasionally.

At $4\frac{1}{4}$ p.m. he became quite unconscious, and the breath-

ing very slow; he could no longer swallow the brandy and iced-water. The face became very cold, and at 4½ p.m. he died, just thirty-two hours from the commencement of his symptoms.

The *post-mortem examination* was made the morning after his death, at 9 a.m. The abdomen only was examined. The external and internal abdominal rings were found quite free. There was about a foot and a half of small intestine enormously distended, and nearly black, lying in the pelvis; on raising this, we found it girt by a band, about an inch and a half long, which was connected with the cæcum on the one side, and with the peritoneum covering the iliacus internus muscle, close to the internal abdominal ring, on the other. This band was round and firm, and seemed to be either one of those bands of old adhesive inflammation, which are occasionally met with in the abdomen, or the remains of the omphalo-mesenteric duct. It must have existed a long while. It was not so tight as to have strangulated the gut in its undistended condition. I have no doubt, that this was the cause of the previous obstinate constipation, and also the cause of the subsequent irritation of the bowels, though it all subsided before the fatal strangulation took place, which terminated his existence.

In the treatment of this case, my friend Mr. Beale and I certainly regarded it as one of those cases of acute hernia, which sometimes terminate so rapidly and fatally, notwithstanding prompt operative interference.

I quite believe, that there are cases of internal strangulation which justify the surgeon in opening the abdomen, and seeking the stricture; but I do not regard this as coming into that class. I think that the evidence should be more complete, that the symptoms are only produced by *internal* strangulation. In this instance they might have arisen from the injury which the intestine received from the stricture during the short time it was in the hernia sac. I confess, that the persistance of the symptoms of strangulation after

the operation astonished me, and disappointed me, inasmuch as the intestine, though not perfectly normal, still presented that appearance which induces a favorable prognosis.

The complete lull, in his distress, which took place the night after the operation, also encouraged the hope, that the gut was gradually recovering from its paralysis; and the passage of feculent matter and flatus, the following morning, sustained this opinion; and though his rapid collapse dispelled this illusion, it seemed to point to gangrene as the immediate cause of a fatal issue of this case.

TWO CASES OF

ABSENCE OF THE THYROID BODY,

AND SYMMETRICAL SWELLINGS OF FAT TISSUE AT THE SIDES OF THE NECK, CONNECTED WITH DEFECTIVE CEREBRAL DEVELOPMENT.

BY

THOMAS BLIZARD CURLING, F.R.S.

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Received May 13th.—Read June 25th, 1850.

THE imperfect state of our knowledge of the office of the thyroid body, and the assistance often derived from facts, even of a negative character, in physiological investigations, independently of other circumstances of interest, lead me to consider the two following cases deserving of record.

CASE I.—In July 1849, Dr. Little invited me to see a case of what he considered *cretinism*, at the Idiot Asylum at Highgate; and to examine some swellings at the sides of the neck, the nature of which were doubtful, but which had been suspected to be enlargements either of the lobes of the thyroid body, or of the lymphatic glands. The inmate was a female child, of stunted growth, ten years of age, and a native of Lancashire. She measured two feet six inches in height. Her body was thick, and her limbs disproportionately large and long. The dorsal surface of the body and limbs was hairy. The head was heavy looking, the forehead flat, and the fontanelles unclosed. The countenance had a marked and very unpleasant idiotic expression. The mouth was large, and the tongue thick and protuberant. At the outer sides of the neck, external to the sterno-cleido

mastoid muscles, there were two tolerably symmetrical swellings, which had a soft doughy inelastic feel. Similar swellings, but smaller and less defined, were observed in front of the axilla. No enlargement existed in front of the neck, nor could the thyroid gland be perceived. The child had very little power of locomotion; but could manage to walk from chair to chair with a little assistance. She had no power of speech. She was able to recognise her parents, and evinced some manifestations of the exercise of the will. She seemed to direct the resident medical officer to be seated, and helped herself to mount on his knee.

I am indebted to Dr. Little for the following additional particulars: she had a severe attack of erysipelas whilst in the institution, after temporary recovery from which her mind seemed more developed. A considerable abscess formed in the thigh, which discharged copiously during many weeks. The wound healed; but erysipelas subsequently reappeared, accompanied with glossitis and stomatitis, from which she died exhausted six months after the commencement of her illness, and about fifteen months after admission into the asylum.

The body was examined twenty-four hours after death by Mr. Callaway, who has favoured me with the following particulars. The body was much emaciated. The swellings in the neck were much less in size than what they had been prior to her illness. They were composed of fat, and occupied the posterior triangle of either side of the neck, dipping downwards behind the clavicles, and filling the axillæ. They could be traced extending slightly over the infraspinal muscles, and the lowest angle of the scapula. They were not enveloped in capsule, but consisted of fat of a loose lobular structure, which seemed under the microscope to be made up of connecting tissue and fat globules. There was not the slightest trace of a thyroid body.

Case II.—In November 1849, a female infant, æt. six months, was sent to me by a surgeon for examination, on account of some anomalous swellings in the neck. The

parents were healthy. The mother was 28 years of age, and this was her second child. The infant was plump, but had a marked idiotic expression,—a large face with a small head, and very receding forehead. The tongue was large and protruding from the mouth. On the sides of the neck, beyond the sterno-cleido mastoid muscles, were two soft symmetrical swellings, having a doughy feel, and incompressible. They were of an oval shape, lying obliquely across the sides of the neck, and extending from the edges of the trapezii to the middle of the clavicles. I was at once struck with the strong resemblance which this case presented, both in respect to the tumours and, the general aspect, to the idiot at Highgate. The mother described the child to me as being helpless with its lower limbs: that is to say, as not being so strong as her former child. She afterwards became ill, refused to take nourishment, and died convulsed December 7th. On dissection of the body next day, nothing abnormal was observed in the brain, except a remarkably small development of the anterior lobes of the cerebrum. A very careful examination was made of the neck, but no thyroid nor trace of this gland could be discovered. The swellings in the neck were found to consist of superficial collections of fat tissue, without any investing envelope, and loosely connected to the surrounding parts.

I am not acquainted with any case on record in which a deficiency of the thyroid gland has been observed in the human body. But apart from the interest which must attach to the cases just related, from their great rarity, the development of adipose tissue forming symmetrical swellings in the neck, cannot fail to add to their importance; for it is highly probable, that this abnormal secretion of fat was dependent on the absence of those changes which result from the action of the thyroid, or on some imperfection in the assimilating processes, consequent on the want of this gland: and the facts here detailed may not be without significance in directing the researches of future inquirers into the use of this body. In countries where cretinism and bronchocele

prevail, it was long supposed, that there was some connection between the defective condition of the brain, and the hypertrophy of the thyroid. Pathologists have recently been inclined to view the coincidence of these two affections as accidental, or as having no direct relation. In the foregoing cases we have examples of a directly opposite condition, viz., a defective brain, or cretinism, combined with an entire absence of the thyroid, which may be regarded as tending to confirm the more modern opinion respecting the connection between cretinism and bronchocele.

ACCOUNT OF A CASE IN WHICH

AN ABSCESS

FORMED IN

THE VESICULA SEMINALIS,

AND PROVED FATAL BY PERFORATION OF THE BLADDER AND EXTRAVASATION OF PUS INTO THE ABDOMINAL CAVITY.

BY

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Henry Wilkins, a Sailor, 20 years old, came to the Middlesex Hospital on the 19th December, 1849, complaining of pain in the loins and hip-joint, and moving so like a person labouring under morbus coxarius, as to lead to his being classed among the patients for admission into the surgical wards. Examination, however, showing that there was no active disease of the hip-joint, he was sent into the medical wards, on the supposition that he might have disease of the kidney.

I am indebted to the kindness of Dr. Crawford, under whose care the patient was, for the opportunity of communicating to the Society the particulars of the case; my own acquaintance with it having commenced only in the post-mortem theatre.

The patient, a person of dull intellect, could give but little account of the origin of his complaint, further than that generally in the enjoyment of good health, he attributed his present symptoms to a severe wetting to which he had been exposed six months before. He had never suffered from gonorrhœa, or from any form of syphilis, and had usually no difficulty in passing his urine.

When seen by Dr. Crawford, he had great tenderness and shooting pain in the left groin and hip, extending up the loin of the same side, and much increased by any motion of

the joint. He had acute febrile symptoms; a red tongue, great thirst, and a quick small pulse. The bowels were moderately open, and the urine of the sp. gravity 1·029, thick and scanty, caused burning pain in its passage along the urethra. Sixteen leeches were applied to the left groin, and he was directed to take Hyd. Chlorid. gr. ij; Opii, gr. ¼, ter. die; and Vin. Colchici, ℥xx; Syrup. Papav. ʒj; ex Decoct. Uvæ Ursi, ʒiss, ter. die.

On the 20th, the symptoms were much mitigated, the febrile attack having abated, and the inguinal pain being felt only on moving the limb. The urine, which was light in colour, deposited a copious thick sediment, which proved to be almost entirely pus. On questioning the lad, it was discovered that a similar deposit had existed for the last three weeks, unaccompanied by pain or uneasiness in the lumbar or hypogastric regions.

He omitted the calomel and opium, and took small doses of Colchicum and Dover's powder, three times a day instead.

21st.—He was not so well. The pain and tenderness on pressure in the left groin had returned with increased violence. There was great constitutional disturbance, with a hot skin and small frequent pulse.

22d.—No abatement in the severity of the symptoms. The patient had not slept the whole night—and there was much headache and sickness without vomiting. Tongue red and dry; pulse 120, small. He was bled from the arm to ʒviij, and resumed the Cal. and Opium. To take effervescing salines.

On the evening of the 22d he commenced to pass blood with his urine, which tinged it of a dark red colour. The purulent deposit still continued. There was little or no abatement in the general symptoms, except the pain in the loin, which had lessened before the hemorrhage began. The pulse 108, and feeble.

23d.—The bleeding still continuing, he was directed to take Acid. Gallic. gr. x; Syrup. Papav. ʒj; Decoct. Uvæ Ursi, ʒiss, every six hours. Barley-water for his drink.

26th.—The urine had lost its red colour, though it still contained much pus. The patient had passed a better night, but was low and feeble.

29th.—Violent purging came on at 11 p.m., and continued to the next day. It was preceded by pain in the abdomen, but there was no rigor. The abdomen was very tender.

Hirudines, x, abdomen. Cat. Lini Postea, Hyd. Chlorid., gr. ij; Pulv. Opii, gr. ¼; 6tis horis; Liq. Ammon. Acet. Mist. Camph. ʒvj; Vin. Antim., Pot. Tart., ♏ xv, ter.

30th.—Vomits everything; abdomen very tender. Pulse small, frequent, and very soft. The alæ nasi distended in breathing.

January 1st.—The vomiting had ceased. Bowels constipated; pulse small and frequent. The extremities were cold, and there was slight delirium. Abdomen still tender. Omitte Haust., and substitute a draught containing a small quantity of Hydrocyanic Acid; Fotus Papaveris postea. Four leeches were applied to the abdomen.

2d.—Hirudines, viij, abdomen; adde ad Pil. Cal. Opii, gr. j.

3d.—He had hiccough since 2 p.m. Pulse 108, and very feeble. Tongue clean and red. Abdomen tympanitic and very tender. About twelve o'clock in the forenoon he died in much agony, but retaining consciousness to the last.

Post-mortem examination, twelve hours after death.—Externally, the body blanched and emaciated. There was nothing calling for remark in the cavities of the head or thorax.

The abdominal cavity was filled with a great quantity of cream-coloured, fluid pus, evidently from an abscess, and not the produce of peritonitis. The peritoneum was in an early stage of inflammation, the intestines slightly glued together, and the surfaces of the liver and spleen covered with a layer of recent lymph.

The liver itself, the spleen, and stomach, and other abdominal organs were quite healthy, but pale. The kidneys and ureters presented no sign, whatever, of disease.

The bladder contained some purulent fluid, and was perforated by an ulcer as large as a sixpence. The penis, testicles, and all the urinary organs were carefully reserved

for further examination, and the question arose, whence did all the pus found in the abdomen proceed? The pelvis, hip-joint, particularly the left one, where there had been so much pain, and the vertebral column, were all examined without throwing any light upon its source. The urethra was slit up; and the testicles, prostate, and neck of the bladder, all examined and found to be healthy. At length, however, the remains of a large abscess was discovered in the situation of the left vesicula seminalis, which was nearly destroyed by suppuration.

The abscess had perforated the bladder, and discharged its contents into that viscus by a small rounded hole; and as the perforation had taken place just where the peritoneum is reflected from the sides of the bladder, the pus had found its way into the abdominal cavity, and set up the fatal peritonitis.

The pathology of this case, hitherto so obscure, was now cleared up, and the course of events can be traced with tolerable certainty.

The formation of the abscess must have been preceded by acute inflammation of the vesicula which occasioned the extreme pain which was so prominent a feature at the time of the patient's admission into the hospital, and the date of its bursting into the bladder is fixed by the passage of pus from it, mixed with the urine. The time, also, when this pus made its way into the abdominal cavity, cannot have been far removed from the attack of hemorrhage from the urethra, which took place twelve days before death.

I have ventured to lay this brief narrative before the Society, because the case which it relates is of a very singular, if not of a unique character; and because it has in it some practical points of interest. The vesiculæ seminales are less liable to active disease than any of the other organs concerned in the function of generation, but they are evidently exempted from acute inflammation and its consequences. Different changes in their structure and contents, occasioned by a slow inflammatory process, are not unfrequently met with after death, in cases where there has been no suspicion

of any disease during life. Of these, the debility and catarrhal inflammation, which, according to Lallemand, extends from the ejaculatory ducts to the vesiculæ, in some of the severe forms of spermatorrhœa, may possibly become of a more acute inflammatory character under the operation of accidental causes, and finally occasion abscess, the exact diagnosis of which must be very obscure. Such abscesses might be confounded with suppuration in the prostate gland, or with disease of the hip-joint, or may probably be included in practice, under the generic name of inter-pelvic abscess, and the like. One of the more uncommon consequences of gonorrhœa is, an excessive irritability of the bladder, accompanied with shivering and discharge of pus with the urine.

It is possible such cases may depend upon suppuration in the vesiculæ seminales, which are, of course, not necessarily mortal, except extravasation should chance to occur into the peritoneal cavity.

Suggestions, such as these, naturally occur in reflecting upon an instance in which the fact of an abscess having formed in the vesicula seminalis, is made sure by the death of the patient; indeed, rare cases of any kind are comparatively useless, if regarded only as medical curiosities; a certain amount of rational speculation is not only allowable, but necessary, if we would derive that instruction and guidance for the future, which all unwonted events may afford to us.

Mr. Cock has communicated to me the following case, in which there is every probability that an abscess had formed in the vesicula seminalis, and in which the fatal event was probably prevented by the timely evacuation of the pus by incision through the rectum. The obscurity of the diagnosis, and the circumstance that disease of the hip-joint had been so closely simulated, are interesting points connected with it.

The patient was about 35 years old, and held a situation in a government office. He had lived fast and was ill conditioned and cachectic.

Some weeks before he was seen by Mr. Cock, he had begun to complain of deep-seated pain and uneasiness in the lower belly, inclining to the left side, and extending around the hip-joint. This was increased by exercise, and also by

a frequently distended state of the intestine, for he was dyspeptic and flatulent. At last he became incapable of performing his duties, and his general health declined rapidly.

Hip-joint disease had been prognosticated, but was decided against by Mr. Cock. There was pain and tenderness on pressure, over the pubes, and towards the left iliac fossa, and when the abdomen was empty and flaccid, a slight fulness could be perceived. He was tolerably free from pain when quiet, and preferred lying on his left side, but could not bear any exertion. There was no history as to cause, and Mr. Cock could not make any satisfactory diagnosis. He said it was an "obscure case," thought it might be a "tumour," or aneurism, or disease of the lower part of the spine, or cellular abscess in the pelvis. The functions of the bladder and lower bowel were normal. Nothing material could be felt by the finger in the rectum.

In the course of three weeks all the symptoms had increased, both local and constitutional. Great febrile excitement, pain now extending up the left loin to the kidney, some intolerance of urine, and lastly, tenesmus and pain in the evacuation of the bowels. As far as Mr. Cock recollects, he had one, and only one, rigor.

After the bowels had been well evacuated by medicine and enema, the rectum was again examined; and now the finger distinctly felt a fulness which encroached on the bowel just above, and to the left of the prostate, corresponding to the situation of the left vesicula seminalis, with an obscure sense of fluctuation, when pressed over the pubes. In two days' time, the projection and fluctuation were more distinct, and came lower down; and as the patient's sufferings were very great, Mr. Cock determined to attempt to relieve him, by gravitating the tumour, which was done with a guarded bistoury. A quantity of thin, dark, offensive pus, was immediately discharged, and the patient continued to evacuate it for two or three weeks, and finally got quite well.

There was no clue as to the cause or original seat of the abscess; but Mr. Cock had an idea that it was caused by some foreign body, as a fish-bone, sticking in the bowel and perforating it, but nothing of the kind came to light.

ON A CASE OF

ALBUMINOUS AND FATTY URINE.

BY

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Cases of so-called chylous urine are so rare, that no extended investigation of the complaint has yet been made. Indeed no very minute investigation of a single case has, as yet, been published.

Some minute chemical details of the following case were communicated to the Royal Society, and the chemical investigation of the fatty matter will be the subject of a paper by Dr. Hofmann. The more purely medical part, consisting of the microscopical examination of the urine, of the history of the case, of the effects of the different kinds of diet to which the patient was restricted, and of the different medicines he took, may be considered worthy of the notice of the Royal Medical and Chirurgical Society. The records of the treatment are the more interesting as the disease proved to be under the control of medicine; the urine returned to a perfectly healthy state. The patient resumed his occupation after giving up work for nine months and a half, and after the complaint had existed for fourteen and a half months at the least.

On 17th of October, 1849, I received from Mr. Partridge three specimens of urine passed at different hours of the same day.

The first specimen was in quantity about four ounces, made at 9:30 a.m., an hour and a half after breakfast, the

patient remaining in bed. It was clear, acid to test-paper, not light coloured. Specific gravity 1022·5. It did not coagulate when boiled, and when nitric acid was added; but the acid made the colour deeper. On the surface there was a slight appearance of oil, which under the microscope was seen to consist of large and small oil-globules, and some streaks of oil. One or two blood-globules were also seen.

1022·5 grains of this urine evaporated to dryness in vacuo over sulphuric acid, gave } 57·8 grains of solid residue,
=56·5 grains of solid matter per 1000 grains of urine.

The residue, dissolved in distilled water, became solid on the addition of nitric acid from nitrate of urea. By the addition of acetic acid to the urine, plenty of uric acid crystals, after some time, were deposited.

The second specimen of urine was in quantity six ounces, passed at 11:30 a.m., two hours after being up. It was of a yellowish-milk colour, quite thick, and spontaneously coagulated, so that it could not be poured from the bottle. The specific gravity was 1017·0. It was very feebly acid to test-paper. Nitric acid and heat gave a considerable precipitate. Under the microscope, I saw blood-globules in some quantity. No trace of oil-globules, but a large quantity of very minute molecular matter, scarcely resolvable by a magnifying power of 320 times. No trace of casts of the ducts could anywhere be found. Little films of coagulum could be seen containing many blood-globules. Treated with ether, the etherial solution was clear, the urine below was cloudy, but on long standing became clear. The etherial solution, on evaporation, gave a great mass of oil-globules; but with the microscope no decidedly crystalline fat was seen.

The spontaneous coagulum was broken up by agitation. It was insoluble at 96° F. It could be kneeded like fibrin. It was washed with distilled water, and gelatinized with strong acetic acid.

1017 grs. of urine evaporated to dryness, gave dry residue =49·1 grs.,
=48·28 grs. of solid matter per 1000 grs. of urine.

The urine, on standing, had the appearance of cream on

the surface. It remained of the same appearance for days; the only change perceptible was, that the blood-globules, after the coagulum was broken by agitation, fell, forming a visible deposit of blood at the bottom of the bottle.

The third specimen of urine was passed at 3:30 p.m., about two hours after dinner. It was about six ounces in quantity; thick, milky throughout. It also would not pour out of the bottle on account of the spontaneous coagulum which had formed. Specific gravity 1016·5. Very feebly acid. Under the microscope, more blood-globules than in the previous specimen were seen. No trace of oil-globules was found; but plenty of molecular matter. No moulds of the ducts could be discovered. The coagulum was much more streaky from blood. The liquid, freed from the coagulum by filtration, gave a considerable precipitate with heat and acid.

1016·5 grs. of urine, evaporated to dryness as before, gave residue . . . . . } =49·20 grs.,

=48·40 grs. of solid matter per 1000 grs. of urine.

Mixed with three times its volume of alcohol, a large precipitate formed, and the urine filtered clear. Two ounces of this specimen of urine were well agitated with an ounce of ether. After perfect separation, the etherial liquid was removed, and the urine freed from fat was evaporated to dryness, and the solid residue was treated with distilled water. The filtered liquid was tested for sugar, but no trace of it was found by the sulphate of copper and liq. potassæ test. Torulæ formed in this urine very quickly and plentifully.

From these reactions, the last two specimens of urine contained fat, fibrin, albumen, and blood-globules. By agitating the coagulum, the fibrin could be broken up, and then could be separated by a filter,—a very small quantity of fibrin giving a very large and weak coagulum. The filtered liquid, on standing, deposited a layer of blood-globules at the bottom of the glass. The milky liquid poured off, agitated with ether, became clear, the fat and oil being

dissolved. After drawing off the etherial solution, on the addition of alcohol to the clear urine, albumen in plenty was precipitated.

The patient, æt. 32, gave me the following history:—His father, a Scotchman, died æt. 65; his mother, a woman of colour, is still alive? He was born in Trinidad, but was sent to Scotland when 7 or 8 years old. He was apprenticed to a harness maker when 12; but the last three years he has been standing cutting out clothes. He is about five feet ten inches tall; weighs nine stone four pounds. He has been married seven years, and had one child, who died when thirteen months old. He had seven brothers, six of them are alive and well. He has been in London for the last twelve years constantly, and has had good health generally all his life.

Last winter he had very hard work, from 6 a.m. to 6, 8, 10, 12 o'clock at night. At times during the winter he had to do porter's work, packing equipments for India. He perspired excessively, and used to return home much exhausted.

During the last seven years he has occasionally endured great hardships and want. He is very sober, and has led a steady life. About Christmas 1848, the urine was observed to be occasionally thick and white, and at times it deposited a pink sediment; and for this peculiar appearance of the water, with pains in the loins and general debility, he applied for medical advice soon after Christmas 1848. He was given steel, and at first improved whilst taking it. He continued his work; the pink sediment and the milkiness of the water very frequently appeared; and he ceased to work on the 26th of May, 1849.

The accompanying Table, which he made himself from the 24th of May to the 18th of August, during which time he was under Dr. Prout's care, shows the state of the disease at that time. I first saw him on the 19th of October. His pulse was 72, very small. The tongue was clean, but slightly coated at the back. His skin was cold: but he perspired when walking, and was in a perspiration when he came to me. He complains now of acute pains at times across the loins; and if he leans against anything, or remains for a few minutes in one

position, he feels pain in the loins on moving. He is very thin, with sunken cheeks, and says his appetite is very good. He had been sent to Margate on the 2d of July, and says, that when there, "his legs took to swelling;" and he thinks the left leg rather swelled now. I did not find it œdematous. The bowels are very confined. His right thumb was stiff from pain some time since; but he has had no general rheumatism.

He can give no reason for the appearance of this complaint, except that it comes from the change of a sitting occupation for a very laborious standing one. Many fellow-workmen were made ill by the work last winter; but he never heard that any of them had any illness like his.

From the following notes he took, it appears that on first giving up work, the urine was clear for eleven days; it then became more constantly milky, but was more clear, for nearly a month, when at Margate, taking warm-baths and cod-liver oil. He continued the oil upwards of seven weeks; but finding the milkiness of the water more constant, he returned from Margate. Four days after this the urine coagulated so strongly in the bladder, that he was unable to pass his water for some hours.

The following notes of the appearances of the urine, from the 24th of May to the 18th of August, are worth recording. Dilute nitric acid and hydrochloric acid, of each fifteen minims twice a day in water, were taken:

May 24-25. White all day.
„ 26. White all day. Gave up work.
„ 27. White all day.
„ 28-29-30-31; June 1-2-3-4-5-6-7. Clear all day. Red sand observed frequently.
June 8. White after dinner. Clear the rest of the day.
„ 9. Clear all day.
„ 10. White after tea. Clear the rest of the day.
„ 11-12. White; fluctuating during the day.
„ 13-14. Clear all day.
„ 15. White after dinner. Clear the rest of the day.
„ 16. White all day.

Total clear days, 15¼ days; total white, 8¼ days; whilst taking the acid medicine.

Half a drachm of dilute sulphuric acid, and eight and a

half grains of alum, were taken three times a day in water for seven days:

June 17-18-19-20-21-22-23. White all day, with settlements of blood on standing, and frequently made of a red appearance. On the last day, the second prescription suspended.

Commenced cod-liver oil, one drachm twice a day, gradually increased to half an ounce twice daily:

June 24-25-26-27-28. White all day, with settlements of blood on standing, and frequently made of a red appearance.

„ 29-30; July 1. Clear all day.

July 2. Clear all day. Went to Margate for warm-baths and sea-air.

„ 3. Clear all day. Red sand in the urine.

„ 4-5. Urate of ammonia deposited, and some red sand.

„ 6. Urate of ammonia during the day; generally clear,

„ 7. Urate of ammonia.

„ 8-9-10. Urate of ammonia the greater part of the day; the rest clear.

„ 11. Clear all day.

„ 12. Urate of ammonia the greater part of the day; the rest clear.

Red sand in the urine frequently.

„ 13. Clear all day. Very little red sand.

„ 14. Clear all day.

„ 15. Urate of ammonia half the day; the rest clear. Red sand in small quantity.

„ 16. Clear all day.

„ 17. Clear the greater part of the day. Urate of ammonia and uric acid the rest of the day.

„ 18. Clear all day; some red sand excepted.

„ 19. Clear all day; some red sand.

„ 20. Clear three parts of the day; the rest, urate of ammonia. Very little red sand.

„ 21-22. Urate of ammonia three parts of the day; clear the rest of the day. Some red sand.

„ 23. Clear three parts of the day; the rest, urate of ammonia.

„ 24. Clear all day.

„ 25. Clear three parts of the day; urate of ammonia after breakfast.

„ 26. Clear all day.

„ 27. Clear half the day; the other half, urate of ammonia and uric acid.

„ 28. White three parts of the day; the rest clear.

„ 29. White all day.

„ 30-31. Clear all day.

August 1. Clear all day. Some red sand.
„ 2. Clear three parts of the day. Urate of ammonia after breakfast, and some red sand.
„ 3. Clear three parts of the day. Urate of ammonia after breakfast, and very little red sand.
„ 4. Clear three parts of the day. Urate of ammonia after breakfast.
„ 5. White all day.
„ 6. Clear three parts of the day; the rest, urate of ammonia.
„ 7. Clear half the day, the rest, urate of ammonia, and red sand.
„ 8. Clear three parts of the day; the rest, urate of ammonia.
„ 9. White all day. Began to feel uneasy in the bladder.
„ 10-11-12. White all day.
„ 13. Clear three parts of the day; urate of ammonia after breakfast. Came home from Margate.
„ 14. White three parts of the day; clear the rest.
„ 15. White three parts of the day; clear the rest. Left off the cod-liver oil. To take liq. potassæ, gutt. xxx, three hours after dinner.
„ 16. White all day.
„ 17. White all day. Stoppage took place from internal coagulation; no instrument, however, was required. He gave up the drops.
„ 18. He was advised to give up noting the water, as it made him nervous.

The urine has been more or less milky each day, since the 17th of August to the 23d of October.

On the 23d of October I began my chemical experiments, by examining the water each time it was passed. (The result will be printed in the 'Philosophical Transactions' for 1850.) I thereby determined the influence of the circulation on the appearance of the albumen and fat in the urine.

Previous to beginning any course of treatment, I got my patient to make constant and careful observations on the appearance of the urine each time it was passed, whilst he took different kinds of diet. It appears from these observations, that the urine was always most clear before breakfast; and that on a more animal diet it was oftener chylous than when he lived on a more vegetable food.

These observations are also interesting, because they show the state of the urine when no medicine was taken. The First Series, from November 6 to 16, shows the appearances of the urine for ten days, when as little vegetable food as possible was taken.

November 6, 1849. Breakfast, three quarters of a pint of tea, no milk, little sugar, chop, half a round of bread; lunch, half a pint of beef-tea, one third of a round of bread; dinner at one, steak, round of bread, half a pint of beef-tea; tea, three quarters of a pint of tea, no milk, little sugar, two eggs; supper, half a pint of beef-tea, half a round of bread. Remained in bed until after breakfast. Urine clear previous to breakfast. No internal coagulations. No red blood, but brown settlements.

12:45, just before dinner .	Not so chylous as usual.
4:15, just before tea . .	More chylous.
9:30, after supper . .	More chylous.
10:15, bedtime . . .	Rather clearer.

Nov. 7. The food this day was the same as yesterday.

6:45, a.m., in bed . .	Much clearer.
8:30, just before breakfast	Clear.
10	Not so chylous.
1:10, just before dinner .	Rather clearer.
4:45, just before tea . .	Rather clearer.
9:10	More chylous.
10:45, going to bed . .	More chylous.

Nov. 8. The food the same as yesterday, excepting beef instead of eggs at tea.

6:45, a.m.	Much clearer.
8:20, just before breakfast	Clear.
10:45	Not so chylous.
1:25, just before dinner .	Not so chylous; some blood.
3:15	More chylous; some blood.
6, after tea	More chylous; some blood.
10, going to bed . . .	Rather clearer.

Nov. 9. The food the same as yesterday, excepting chop for dinner. Up before breakfast.

6 : 15, a.m.	Not so clear.
8 : 10, just before breakfast	More dull.
9 : 20	Not much chyle.
11	Rather chylous.
1 : 15, just before dinner	More chylous.
4 : 15, just before tea	More chylous.
7	More chylous.
10, bedtime	Not so chylous.

Nov. 10. Up early, before breakfast, which was the same as yesterday, with two eggs; dinner, chop; tea, chop; supper, calf's foot and half a round of bread.

6, a.m.	Not so clear.
8 : 15, just before breakfast	More dull.
11	Not so chylous.
1, just before dinner	More chylous.
3 : 30	More chylous.
5 : 45, after tea	More chylous.
8	Not so chylous.
10 : 15, bedtime	More chylous.
3, a.m.	Rather dull.

Nov. 11. Out of bed before breakfast. Chop for breakfast; lunch, calf's foot and half a round of bread; dinner, roast mutton; tea, two eggs; no supper.

8 : 20, just before breakfast	Clearer.
10 : 30	Rather chylous.
1 : 15, just before dinner	More chylous.
3 : 25	More chylous.
6, just after tea	Rather clearer.
9 : 35, going to bed	Rather clearer.
4, a.m.	Rather clearer.

Nov. 12. In bed until after breakfast. Breakfast, roast mutton; lunch, calf's foot; dinner, roast mutton; tea, two eggs; supper, calf's foot and half a round of bread.

9, just before breakfast	Clear.
11	Rather chylous.
1 : 35, just before dinner	More chylous.
4 : 15, just before tea	More chylous.
7 : 15	More chylous.
10	More chylous.

Nov. 13. In bed until after breakfast, which consisted of roast mutton; calf's foot and bread for lunch; dinner, roast mutton; tea, two eggs; supper, calf's foot.

6:30, a.m.	Not so clear.
8:15, just before breakfast	Clear.
10:30	Rather chylous.
12	More chylous.
1:20, just before dinner	More chylous.
3:30	More chylous.
6:20, after tea	More chylous.
9:30, bedtime	More chylous.

Nov. 14. Out of bed before breakfast. Breakfast, chop; no lunch; dinner, chop; tea, two eggs; supper, beef-tea.

5:45, a.m.	Not so clear.
7	Much clearer.
12:15	Chylous.
3:20	More chylous.
7:30	More chylous.
10, bedtime	More chylous.

Nov. 15. Up before breakfast. Breakfast, two eggs; dinner, chop; tea, two eggs; supper, beef-tea.

6, a.m.	Rather clearer.
8, just before breakfast	Clear.
10	Rather chylous.
1, just before dinner	More chylous.
4	More chylous.
8:30	Not so chylous.
10:15, bedtime	Not so chylous.
6:30	Rather clearer.
8:15, just before breakfast	Much clearer.

The Second Series shows the appearances of the urine for fourteen days, from Nov. 16 to 30, when a much more vegetable diet was taken. The first three and the last five days of this Series gave the following results:

Nov. 16. Up half an hour before breakfast; tea and bread for breakfast; dinner, chop, boiled rice, broccoli, bread; tea, pint of sago and bread; supper, sago and bread.

11, a.m.	Not so chylous.
1:20, just before dinner	Not so chylous.
4:30, just before tea	Not so chylous.
8:30, just before supper	Not so chylous.
10, bedtime	Not so chylous.
2	Rather pale.

Nov. 17. Out of bed one hour before breakfast. Breakfast, arrow-root and toast; dinner, chop, cabbage, and bread; same as breakfast for tea; supper, arrow-root and bread.

6:30, a.m.	More natural, clear.
8:25, just before breakfast	Rather dull.
10	Dull red colour.
11	Slightly chylous.
1:30	Slightly chylous, coagulated.
4:15, just before tea	More chylous.
10, bedtime	More chylous.
3:30	Rather pale.

Nov. 18. Up half an hour before breakfast. Breakfast, sago and bread; dinner, chop, broccoli, boiled rice, and bread; tea, sago and bread; supper, sago and bread.

7:15, a.m.	More natural.
8:45, just before breakfast	Rather dull.
11:30	Slightly chylous, coagulated.
1, just before dinner	Slightly chylous, coagulated.
4:30, just before tea	Rather more chylous, coagulated masses.
9	More chylous.
10:15, bedtime	More chylous.
3:30	Rather pale.

Nov. 25. In bed until after breakfast. Breakfast, tapioca and bread; dinner, chop, broccoli, and boiled rice; tea, sago and bread; supper, tea and bread.

5:30, a.m.	Not so clear.
9:15, just before breakfast	More natural.
1:15, just before dinner	Slightly chylous; internal and external coagula.
4:45, just before tea	More chylous.
10, bedtime	Slightly chylous.
5:30	Pale, not so clear.

Nov. 26. In bed until 9 : 20. Breakfast, sago and bread; dinner, chop, broccoli, and bread; tea, tapioca and bread; supper, tea and bread.

8 : 15, just before breakfast	Natural.
1, just before dinner	Natural; deposit of urates.
4 : 15, just before tea	Chylous.
8 : 40	Not so chylous.
10 : 30, bedtime	Not so chylous.
6 : 30	Natural.

Nov. 27. In bed until after breakfast. Breakfast, as yesterday; dinner, mutton, broccoli, bread, and rice; tea and supper as yesterday.

8 : 45, just before breakfast	Natural.
1, just before dinner	Slightly chylous; external coagulum.
4, just before tea	Very chylous; internal and external coagulum.
9	Not so chylous.
10, bedtime	Not so chylous.
6 : 30	Rather pale.

Nov. 28. In bed until after breakfast. Breakfast, sago and bread; dinner, steak, rice, and bread; tea, tapioca and dry toast; no supper.

8 : 30, just before breakfast	Natural.
11 : 45, just before dinner	Slightly chylous.
4 : 30, just before tea	Rather more chylous.
10 : 30, bedtime	Rather more chylous.
6 : 30	Rather pale.

Nov. 29. Up half an hour before breakfast. Breakfast, as yesterday; dinner, beef, broccoli, and bread; tea, tapioca and bread; supper, tea and bread.

8 : 15, just before breakfast	Natural.
10 : 15	Rather dull.
1, just before dinner	Slightly chylous.
4 : 45, just before tea	Rather more chylous.
10 : 30, bedtime	Rather more chylous.
4	Not so clear; pale.

Nov. 30. Up an hour after breakfast. Breakfast, chop,

weak tea, bread; dinner, chop, bread, beef-tea; tea, two eggs, bread; supper, beef-tea, bread.

7:15, a.m.	Natural
10:15	Rather chylous.

THIRD SERIES; for three days more animal food was taken. From November 30 to December 2.

1, just before dinner . . .	Very chylous.
4:45, just before tea . . .	Not so chylous.
10:15, bedtime . . .	More chylous.
5	Slightly chylous.

Dec. 1. Up an hour and a half after breakfast. Breakfast, tea, two eggs, bread; dinner, chop and bread; tea, chop; supper, beef-tea and bread.

8, just before breakfast . .	Natural but dull, with chyle.
9:45	Rather chylous.
1, just before dinner . . .	More chylous.
4:20, just before tea . . .	Very chylous.
9:15	Very chylous.
6	Rather chylous.

Dec. 2. In bed all day. Breakfast, tea, two eggs, and bread; dinner, roast mutton and bread; tea, two eggs; supper, dry bread.

9, just before breakfast . .	Natural, but dull with chyle, became thick from urates.
1, just before dinner . . .	Slightly chylous.
4:45, just before tea . . .	Slightly more chylous.
9:30	Not so chylous.
6:30	More natural, but dull with chyle.

	Very chylous.	Chylous.	Slightly chylous.	Not chylous
Thus: 1st Series. Ten days, more animal food—71 observations	—	34	32	5
2d Series. Fourteen days, more vegetable food—91 observs.	2	20	40	29
3d Series. Three days, more animal food—17 observations	3	3	8	3
Hence: Total. Animal food—88 observations . .	3	37	40	8
Total. Vegetable food—91 observations . .	2	20	40	29

From the same observations, the periods of the day, at which the urine was most loaded, and most free from chyle, may be seen. Thus:—

	Long before breakfast.	Just before breakfast.	After breakfast.	Before dinner.	Before tea.	Before supper.	Bedtime.
1st Series. More animal food for ten days.	Slightly chylous ten days.	Slightly chylous five days. Clear five days.	Slightly chylous nine days.	Chylous eight days. Slightly so two days.	Chylous nine days. Slightly so one day.	Chylous eight days. Slightly so two days.	Chylous five days. Slightly so five days.
3d Series. More animal food for three days.	Slightly chylous three days.	Slightly chylous two days. Not chylous one day.	Slightly chylous one day.	Very chylous one day. Chylous one day. Slightly so one day.	Very chylous one day. Chylous one day. Slightly chylous one day.	——	Very chylous one day. Chylous one day. Slightly chylous one day.
Hence: total,—thirteen days. More animal food.	Slightly chylous thirteen days.	Slightly chylous seven days. Not chylous six days.	Slightly chylous ten days.	Very chylous one day. Chylous nine days. Slightlychylous three days.	Very chylous one day. Chylous ten days. Slightly chylous two days.	Chylous eight days. Slightly chylous two days.	Very chylous one day. Chylous six days. Slightly chylous six days.
2d Series. Vegetable food for fourteen days.	Slightly chylous five days. Not chylous eight days.	Slightly chylous five days. Not chylous nine days.	Slightly chylous nine days. Not chylous one day.	Chylous one day. Slightly chylous eleven days. Not chylous two days.	Very chylous two days. Chylous nine days. Slightly chylous three days.	Chylous five days. Slightly chylous five days.	Chylous five days. Slightly chylous seven days. Not chylous one day.

Whether the diet was vegetable or animal, the urine was most chylous after dinner, and least chylous before breakfast. It was more frequently chylous after animal, than after vegetable, food; and it was oftener free from chyle before breakfast, when the diet was vegetable, than when it consisted more of animal food.

Having thus satisfied myself that animal diet had no advantage over vegetable food, I next endeavoured to determine what the influence of pressure would be. A stout, well-padded belt was made, so that by straps, considerable pressure could be made on the abdomen and over the region of the kidneys.

Fourth Series of Observations. For five days the belt was kept as tight as he could bear it.

Dec. 7. Out of bed an hour and half before breakfast, which consisted of sago and bread; dinner, chop, cabbage, and bread; tea and supper, sago and bread.

6 : 30, a.m.	Natural.
8 : 30, just before breakfat	Slightly loaded with urates of ammonia.
1, just before dinner	More loaded with urates.
4 : 45, just before tea	Very chylous.
8 : 30	Slightly chylous.
10 : 15, after supper	Rather more chylous.
12 : 30	Pale, but slightly tinged with chyle.

Dec. 8. In bed until after breakfast. Breakfast, sago and bread; dinner, chop, cabbage, and bread: tea, sago and bread; supper, sago and dry toast.

7, a.m.	Natural.
6 : 45, just before breakfast	Natural.
12 : 15	Slightly chylous.
4 : 30, just before tea	More chylous.
10	Not so chylous.
4 : 30	Pale, but more natural.

Dec. 9. In bed until after breakfast. Breakfast as

before; dinner, mutton, broccoli, and bread; tea, sago and bread; supper, coffee and bread.

7 : 30, a.m.	Natural.
1, just before dinner	Slightly loaded with urates.
6 : 30	Very chylous.
10	Not so chylous.
2 : 30	Pale, but more natural.

Dec. 10. Out of bed half an hour before breakfast, which was as before; dinner, mutton, cabbage, and bread; tea, sago and bread; supper, tea and bread.

8 : 15, before breakfast	Natural.
1, just before dinner	Slightly loaded with urates.
4 : 15, just before tea	Not the very chylous.
10	Not so chylous.
1	Clearer, but loaded with chyle

Dec. 11. Out of bed half an hour before breakfast, which was as yesterday; dinner, chop, a little mutton-broth, and bread; tea, sago and bread; supper, coffee and bread.

7 : 30, a.m.	Natural.
1	Very slightly chylous, external coagulum.
4 : 30	Not the very chylous, internal coagulum.
10	Not so chylous.
2	Pale, but more natural.

	Very chylous.	Chylous.	Slightly chylous.	Not chylous.
This series contains 27 observations	2	7	6	12

For six days the belt was worn much more loose.

FIFTH SERIES.

Dec. 12. Out of bed half an hour before breakfast. Breakfast, sago and bread; dinner, rabbit, with cabbage and bread: tea, sago and bread; supper, sago and bread.

8, a.m.	Natural.
1, just before dinner	Very slightly chylous.
4 : 30, just before tea	Very chylous.
10	Very chylous.
4	Slightly chylous.

Dec. 13. In bed one hour after breakfast. Breakfast as before; dinner, mutton, ham, cabbage, and bread; tea, sago and bread; supper, coffee and bread.

7 : 45, a.m.	Natural.
10 : 30	Natural.
1, just before dinner	Slightly chylous.
4, just before tea	Not the very chylous.
8	Not so chylous.
10	Much clearer.
12	Pale as water.

Dec. 14. In bed half an hour after breakfast, which was as before; dinner, mutton, cabbage, and bread; tea and supper as yesterday.

5 : 30, a.m.	More natural.
7 : 45	Natural.
10 : 30	Slightly loaded with urates.
1, just before dinner	Slightly chylous.
4 : 15, just before tea	Not the very chylous.
9 : 30	Not the very chylous.

Dec. 15. Up one hour before breakfast, which was as yesterday; dinner, tea, and supper, the same.

5 : 15, a.m.	More natural, but dull with chyle.
7 : 30	Natural.
10 : 15	Slightly chylous.
1, just before dinner	Slightly chylous.
4 : 15, just before tea	More chylous.
8	More chylous.
10	Not so chylous.
2 : 30	Pale, but more natural.

Dec. 16. In bed until after breakfast, which was as yesterday; so also other meals.

7 : 30, a.m.	Natural.
9 : 45	Natural.
1, just before dinner	Slightly chylous.
5, just before tea	Not the very chylous.
10	Not the very chylous.
5 : 30	Dull with chyle, but more natural.

Dec. 17. In bed until after breakfast, which was as before; lunch, mutton and bread; dinner, roast pork and bread; tea and supper as before.

8 : 20, a.m.	Natural
10 : 30	Slightly chylous.
1, just before dinner	Rather more chylous, internal coagula.
4 : 15	Very chylous.
7 : 30	Very chylous.
10	Not so chylous, internal coagula.
1	Pale, but loaded with chyle.

Dec. 18. Up half an hour before breakfast, which was as yesterday; dinner, mutton, cabbage, boiled rice and bread; tea and supper as before.

7 : 30 a.m.	Natural.
10 : 30	Slightly chylous.
1, just before dinner	Rather more chylous, external coagula,

	Very chylous.	Chylous.	Slightly chylous.	Not chylous.
In this Series 42 observations were made	5	11	12	14

The belt was again made as tight as possible for eight days.

SIXTH SERIES.—Dec. 18.

2 : 30, a.m.	More chylous, mixed with blood, internal coagulum.
5	Not so chylous, more free from blood.
8 : 15	Not so chylous, less blood.
10	Not so chylous, less blood.
2	Pale, but more natural, slightly loaded with chyle.

Dec. 19. Out of bed half an hour before breakfast, which was the same as yesterday. So also dinner and tea. Improved.

7 : 45, a.m.	Natural.
10	Still natural.
1, just before dinner	Very slightly chylous.
5, just before tea	Rather more chylous.
9	Rather more chylous.
11	Pale, but loaded with chyle.

Dec. 20. Out of bed half an hour before breakfast, which was as before; dinner, rabbit, cabbage, rice, and bread: tea as before; no supper. Improved.

2, a.m.	Natural.
8 : 30	Natural.
1	Very slightly chylous.
4 : 15, just before tea	Rather more chylous.
7 : 15	Rather more chylous.
10	Rather more chylous.
5 : 30	Natural.

Dec. 21. As yesterday, except dry toast at supper. Improved.

8 : 30, just before breakfast	Natural.
10	Natural.
1, just before dinner	Slightly loaded.
4 : 15, just before tea	Rather chylous.
8	Not so chylous.
10	Still less chylous.
5 : 15	Natural, but slightly loaded with chyle.

Dec. 22. In bed till after breakfast, as before: dinner, mutton, rice, cabbage, and bread; tea, sago and bread; supper, mutton and bread. Improved.

8 : 30, just before breakfast	Natural.
10 : 15	Natural.
1, just before dinner	Slightly loaded.
4 : 15, just before tea	Rather chylous.
8, just before supper	Not so chylous.
10	More chylous.
4	More natural, but loaded with chyle.

Dec. 23. In bed until after breakfast. Breakfast, sago and bread; dinner, roast mutton, cabbage, and bread; tea, sago and dry toast; supper, dry bread.

7, a.m.	Natural.
10	Natural.
1, just before dinner	Very slightly loaded.
4 : 15, just before tea	Not the very chylous.
7 : 30	Not so chylous.
10	Still less chylous.
11 : 15	Rather natural, but loaded with chyle.

Dec. 24. In bed until after breakfast, which was as before; dinner also; tea, sago and bread; supper, dry toast.

6, a.m.	Natural.
10	Natural.
12, just before dinner	Very slightly chylous.
4:15	Not the very chylous.
9	Not so chylous.

Dec. 25. In bed until after breakfast, which was as yesterday; dinner also, with rice; tea, sago, dry toast; no supper.

7, a.m.	More natural, but loaded with chyle.
10	Natural.
1, just before dinner	Very slightly chylous.
4:15, just before tea	Not the very chylous.
10	Pale, but slightly loaded with chyle.

Dec. 26. In bed until after breakfast. Breakfast as yesterday; dinner, chop, cabbage, rice, bread; tea, sago and bread; no supper.

2:45, a.m.	Rather more natural, but loaded with chyle.
7	Natural.
9	Natural.
1, just before dinner	Slightly chylous.

	Very chylous.	Chylous.	Slightly chylous.	Not chylous.
In this Sixth Series, 53 observations were made	1	16	17	19
Hence: Fourth and Sixth Series— 80 observations: belt tight	3	22	24	31
Fifth Series— 42 observations: belt loose	5	11	12	14

From this it appears, that during the days the belt was tight the urine was less chylous than on the days when the belt was loose. The difference was not, however, very great, though he stated, that the pressure relieved the pain in the back very considerably.

The effect of medicines on the urine was next observed. The first medicine chosen was matico, and this was selected for its astringent properties. If its virtues depend, as is said, on a stimulating essential oil, this may account for its

not having fully answered the end of restoring the urine to its healthy state. At first two drachms of the leaves were infused in a pint of boiling water, and two ounces of this were taken three times a day. The strength of the infusion was gradually increased, until eight drachms of the leaves were infused in a pint of water, and from three to eight ounces of the infusion were taken in the day. The experiments were continued from Dec. 26 to Feb. 11, inclusive. The last fortnight, when the strongest doses of the matico were taken, will probably be considered as best exemplifying its effect on the urine. I may sum up the previous observations when matico was taken thus:

Seventh Series.—From Dec. 26 to Jan. 28, inclusive, is 34 days; in this time 211 observations were made:

Very chylous.	Chylous.	Slightly chylous.	Not chylous.
7	27	69	108

Eighth Series.—From Jan. 29 to Feb. 11, inclusive, matico in stronger doses was taken.

Jan. 29. Out of bed before breakfast. Breakfast, sago and bread; dinner, mutton, rice, and bread; tea, sago and bread; supper, coffee and bread.

7, a.m. . . .	Natural.
9:30 . . .	Very slightly loaded with urates.
1 . . .	Rather more urates.
5 . . .	Rather chylous.
9:30 . . .	Still less chylous.
12 . . .	Rather pale, but natural.

Jan. 30. Out of bed before breakfast. Breakfast, sago and bread; dinner, mutton chop and bread; tea, sago and bread; supper, coffee and bread.

7:15 . . .	Natural.
9:30 . . .	Very slightly loaded with urates.
12:30 . . .	Rather more urates.
2:30 . . .	Rather more urates.
5 . . .	Not so chylous.
8 . . .	Still less chylous.
10 . . .	Pale, but slightly loaded with chyle.
1 . . .	Rather pale, but natural.

Jan. 31. Out of bed before breakfast. Breakfast, sago and bread; dinner, mutton, cabbage, and bread; tea, sago and bread; supper, coffee and bread.

7, a.m.	Natural.
10 : 45	Rather loaded with urates.
1	Rather pale, but clear—natural.
5	Not so chylous.
9 : 30	Still less chylous.
3 : 45	Pale, and rather loaded with chyle.

Feb. 1. As yesterday in all things.

8 : 30, a.m.	Natural.
10	Rather loaded with urates.
1	More loaded with urates.
6 : 25	Not so chylous.
10	Still less chylous.
12 : 25	Rather pale, but more natural.

Feb. 2. As the day previous.

4, a.m.	Natural.
7 : 15	Natural.
9 : 15	Natural.
10 : 15	Slightly loaded with urates.
1	More urates.
5 : 10	Rather chylous.
10 : 30	Not so chylous.
12 : 45	Pale, but rather loaded with chyle.

Feb. 3. As before, except that no supper was taken.

7 : 45	Natural.
10 : 15	Slightly loaded with urates.
1	More urates.
7 : 20	Rather chylous.
10	Not so chylous.
12 : 15	Pale, but loaded with chyle.

Feb. 4. As yesterday.

7 : 15	Natural.
10	Rather loaded with urates.
1	More urates.
5	Not so chylous.
10 : 30	Still less chylous.
1 : 45	Rather pale, but natural.

Feb. 5. As yesterday.

7 : 10, a.m.	Natural.
10 : 30	Rather loaded with urates.
1	More urates.
5 : 30	Not so chylous.
10	Still less chylous.
12 : 15	Pale, slightly loaded with chyle.

Feb. 6. In bed until after breakfast. Breakfast, sago and bread; dinner, fish and bread; tea, sago and bread; supper, coffee and bread.

6 : 45 a.m.	Natural.
10	Some urates.
1	Rather pale, but more natural
5 : 15	Not so chylous.
8 : 30	Still less chylous.
10 : 15	Much less chylous.

Feb. 7. Out of bed before breakfast, which consisted of sago and bread; dinner, mutton, rice, and bread; tea, sago and bread; supper, coffee and bread.

7, a.m.	Rather pale, but natural.
10	Slightly loaded with urates.
1	Not so loaded.
4	Not so chylous.
7 : 45	More chylous.
10	Pale, and slightly loaded with chyle.
1 : 30	Rather pale, but natural.

Feb. 8. As yesterday, except cabbage instead of rice at dinner.

7 : 15, a.m.	Natural.
10 : 15	Rather loaded with urates.
1	More urates.
4 : 45	Not so chylous.
10	Still less chylous.
11 : 30	Pale, and slightly loaded with chyle.

Feb. 9. Out of bed one hour before breakfast. Breakfast, sago; dinner, fish and bread; tea and supper as yesterday.

7 : 15, a.m.	Natural.
8 : 40, just before breakfast	Rather dull.
1	More loaded with urates.
5	Less chyle.
8 : 30	Still less chyle.
11	Rather more chylous.
3 : 20	Rather pale, but natural.

Feb. 10. Out of bed before breakfast; dinner, mutton, cabbage, bread; tea, sago and bread.

7 : 30, a.m.	Natural.
9 : 50	Rather loaded with urates.
1	More clear and natural.
8 : 30	Rather chylous.
10 : 20	Rather chylous.

Feb. 11. In all respects as yesterday.

7 : 10, a.m.	Rather loaded with chyle.
10	Slightly chylous
1, just before dinner	Slightly chylous.
3 : 25	Slightly chylous.
7 : 30	Slightly chylous.
10 : 30	Rather more chylous.

	Very chylous.	Chylous.	Slightly chylous.	Not chylous.
Eighth Series, 14 days, 89 observations	1	10	28	50

By comparing these results with the observations when animal or vegetable diet was taken, the improvement is distinctly evident.

Though the matico effected a considerable improvement in the urine, yet it did not hinder the fat from passing off; and the precipitate, by heat and nitric acid, was not diminished. On this account I tried gallic acid, beginning with one drachm dissolved in warm water, taken in divided portions during the day.

The gallic acid was begun after breakfast on the 13th of February, in the morning. The urine, the day previously, was highly albuminous.

Ninth Series.—From the 13th to the 16th of February; 27 observations.

Feb. 13. Out of bed before breakfast. Breakfast, sago and bread; dinner, cold mutton, cabbage, and bread; tea, sago and bread; supper, tea and bread.

8:10, a.m., before breakfast	Natural.
1:15, just before dinner	Very slightly loaded with urates.
5:15, just before tea	Not so chylous.
8:30	Very slightly chylous.
10	Rather more chylous.
11:30	Pale as water.

Feb. 14. Out of bed before breakfast. Breakfast, as before; dinner, fish and bread; tea, as before; no supper.

7, a.m.	Natural.
12:30, before dinner	Very slightly loaded with urates.
2	Rather pale, but clear and natural.
4, before tea	Very slightly chylous.
8	Very slightly chylous.
10	Very slightly loaded with urates.

Feb. 15. Out of bed one hour before breakfast, which was as yesterday; dinner, mutton chop, cabbage, and bread; tea, as yesterday; no supper.

5:25, a.m.	Natural.
9:15	Natural.
11:45, before dinner	Natural.
1:45	Much paler.
5, just before tea	Again natural.
9:35	Again natural.
10:15	Very pale.
12	Pale as water.

Feb. 16. Out of bed one hour before breakfast, which was as before; dinner, fish and bread; tea, as before; no supper.

7:10, a.m.	Natural.
9:15	Natural.
12, before dinner	Natural.
2:30	Rather paler.
6:30	Again natural.
10	Again natural.
12	Very pale.

From Feb. 16 to April 7, the gallic acid was continued in decreasing doses.

From the 16th to the 20th of February, the urine was free from chyle; 19 observations.

Feb. 19.

Urine passed at 7, a.m., clear, contained no albumen.
" 9:30, clear, no albumen.
" 12, clear, no albumen.
" 3:30, slight cloudiness from infusoria; no albumen.
" 6:45, clear, no albumen.
" 10 the same.
" 12:30 the same.
" 7, a.m. the same.

From Feb. 20 to March 4, the urine was observed 75 times each time it was made, and it was always free from chyle. On the 2d of March, each time it was passed, it was free also from albumen. On the 4th of March the patient resumed his work.

Up to the 9th of March he continued taking 60 grains of gallic acid daily; on this day, breakfast at 8:45, dinner at 1.

Water passed at

7, a.m.,	slightly cloudy from infusoria,	no albumen, sp. gr. = 1010·1
11	clear	no albumen, sp. gr. = 1019·7
6:20, p.m.,	clear	no albumen, sp. gr. = 1025·7
10	clear	no albumen, sp. gr. = 1026·2

The quantity of gallic acid was diminished to about 46½ grains daily, and this was continued to March 24th. From the 4th to the 24th, the urine was observed 98 times; no chylous appearance was observed. On the 24th of March the urine was free from albumen, and the quantity of gallic acid was diminished to 30 grains daily. On March 31st it was reduced to 15 grains, and on the 6th of April the medicine was taken for the last time. On this day, April 6,

Urine passed at 7:30 a.m., slightly cloudy from infusoria; no albumen.
" " 6:10 p.m., clear; no albumen.
" " 10 p.m., clear; no albumen.

He observed, on two or three occasions, that the urine, on standing, gave a deposit which redissolved by heat. Since the 24th of March, the urine was observed seventy-two times, and was never chylous. He feels perfectly well, and he works about eight hours daily. The gallic acid was taken for fifty-three days, during which time the urine was passed 290 times. It was more or less chylous five times; free from chyle, 285.

On the 14th of April I again examined the urine, and no albumen was present in it. No medicine had been taken since the 6th. The urine had been passed thirty-nine times, and was never chylous.

The result of these observations, made from the 6th of November to the 7th of April, will be best seen by showing in each series the proportion of the chylous urines to the urines free from chyle, supposing 1000 observations had been made.

		In 1000 observations.	
		Chylous in different degrees.	Free from chyle.
Thus:—1st.	On animal food the proportion is	968 times	32 times.
2d.	Vegetable food „ „ „	910 „	90 „
3d.	Pressure belt loose „ „	667 „	333 „
4th.	Pressure belt tight „ „	638 „	362 „
5th.	When matico was taken „ „	474 „	526 „
6th.	When gallic acid was taken „	17 „	983 „
7th.	After gallic acid was taken „	0 „	1000 „

The second day after taking the gallic acid, the chyle and albumen disappeared from the urine; and for the last fifty-eight days no chyle or albumen has been found to be present in it.

For the last forty-one days the patient has resumed his work. For the last eight days no medicine has been taken, and the urine has remained healthy.

For the next sixty-one days, namely, from the 14th of April to the end of the 14th of June, there were 311 observations of the urine. It was never chylous. It was examined once a fortnight, each time it was passed during the day, and I have not found a trace of albumen to be present in it on any occasion.

From the 14th of June to the end of August the urine was healthy.

The following case, which occurred in St. George's Hospital when I was Dr. Hope's clinical clerk, shows how slight the affection of the urine and kidneys may be in this disease, so-called chylous urine.

Harriet Best, æt. 35, married, and has had four children,

all of whom are said to have died of hydrocephalus, one at 3 months, another at 9 months, the third at 17 months, and the last at 3½ years. Admitted into St. George's Hospital, under Dr. Hope, June 27th, 1840; youngest child is 3 weeks old. It was weaned, and died two months afterwards. Eleven years ago, after a confinement, was swelled in the face and legs; has frequently had rheumatic fever; has had some anasarca for six months. A few days after her confinement, her left arm became œdematous and paralysed. At present, complains of dyspnœa and palpitation, with orthopnœa and habitual dry cough; complexion pallid and sallow; pulse 126, very small and weak, rather unequal; respirations forty a minute; tongue clean; bowels regular; urine natural in quantity, but thick and dark. Five months ago had hæmoptysis, to the extent of a quart. Impulse of the heart strong and heaving; murmur with the first sound below the outside of the left mamma; sonorous and mucous rales in the lungs; slight bronchophony in left apex. Bluepill, squill, and digitalis, ter. die; nitric ether and acetate of potash, ter. die.

29th. A slight trace of albumen in the urine; sp. gr. 1016.

July 1st. Gums sore; no fetor; swelling decreases; arm the same; urine more abundant; garg. alum.

2d. Urine still increases; contains a large quantity of albumen.

6th. Dismissed at her own request.

15th. Readmitted under Dr. Wilson. Has anasarca of the lower extremities, dyspnœa, and orthopnœa; countenance pale, dusky, anxious; catamenia have not appeared; tongue white, flabby; bowels relaxed; pulse small and weak; no milk for the last three weeks.

Quinæ sulph., gr. ⅔; Inf. caryophylæ, ℥ss.; Inf. aurantii, ℥j, t. d.; Ext. lactucæ, gr. iij, o. n. Hr. Rhei, c. m.

18th. Much pain in the bowels, much troubled with flatulence.

19th. At present legs are somewhat œdematous; belly tumid; fluctuation not distinct; complains of cough; slight murmur with the first sound; second sound clear.

20th. Complains of sickness. Tincture of cantharidis, ♏x, singulis haustibus. Roast slice.

21st. Urine passed last night is of a yellowish white colour, and contains a large white coagulum, like curds floating on the surface, and partly adherent to the sides of the vessel; smells sour, is acid to test paper; specific gravity, 1017; gives a coagulum with heat and with nitric acid, but not with heat when acetic acid is first added.

22d. Urine of the same nature, in much smaller degree.

23d. Urine natural, yellow colour; no trace of spontaneous coagulation; not so much use in the arm as on the 19th.

24th. Urine in large quantity, clear; says that there was the same appearance as on the 21st; twice in the urine when at home, and once when first in the house; bowels relaxed; countenance less dusky.

August 17th, made an out-patient; no return of the appearance in the urine.

Sept. 9th, 1840. Admitted to the Plymouth Dispensary, under Dr. Hingston. She is seated up in bed, and complaining of pain in the left side; cannot bear the recumbent position, and leans towards the side complained of; breathing short and frequent (36 per minute), and unable to inhale deeply, from the aggravation of pain, and a sense of constriction and great distress; has no cough; tongue moist and clean; complexion clear, and of a pale cachectic colour, with a fixed redness of the cheeks, which are puffed; pulse 108, regular, small, and equal; left arm and hand much swollen, and wanting in power to a great extent; abdomen tumid, with indistinct fluctuation; legs very œdematous; bowels open; urine natural in appearance, though lately said to be scanty; appetite good; sleeps much; memory very uncertain; speech sometimes exceedingly impaired.

The impulse of the heart is a little greater than usual, but about its normal place; a soft bruit is heard in connection with the first sound, which is in good relation to the second; but there is an irregular action of the heart during the period (commonly of rest) between the second and first sounds, which is very peculiar; the bruit is most plainly perceived between the fourth and fifth ribs, and seems to diminish in moving the ear downwards towards the apex

It is scarcely audible between the second and third ribs of the left side.

The breathing loud and puerile over the upper part of the chest; in other parts, where there was unequal dullness on persion, were various rhonchi, mucous and crepitant. She died about a fortnight after her admission.

Post-mortem.—The sternum and cartilages of the ribs being removed, a patch of recent loose fibrin, about three inches in superficial diameter, lies upon the left pulmonary pleura, and connects it to the costal pleura. Pleural surfaces, on either side, almost universally adherent by old adhesions. The lobes of either lung adherent, by the same medium, to each other. The external part of the lungs very dark and livid. The cut surface is of a very dark and livid colour, in spots, easily breaking down under the finger, and on pressure permitting a large quantity of frothy serum to escape. At the base of the left lung, and towards its posterior surface, is a small spot of pulmonary apoplexy.

Pericardial surfaces closely adherent throughout by firm cellular tissue; heart one third larger than natural; parietes of ventricles about their usual thickness, if anything, rather attenuated; both ventricular cavities considerably increased in capacity; auricles much dilated; musculi pectinati of the right side much developed; lining membrane of the left auricle of a buff colour; thickness of its walls normal; right auriculo-ventricular orifice easily admits three fingers and the thumb; pulmonic opening admits two fingers very readily; artery itself considerably dilated; left auriculo-ventricular orifice, a cartilaginous ring, which tightly embraces the fore-finger when thrust into it; the angles of the valve adherent to each other, and the membranes of the valve very thick and cartilaginous; aortic opening natural; spleen rather large; liver of an immense size; its section is just like that of a nutmeg; kidneys rather small, but healthy; stomach large, but presents nothing peculiar; head not examined; there was about a quart of turbid serum in the cavity of the abdomen.

OBSERVATIONS ON THE

PROLONGED EXPIRATORY MURMUR

AS A SIGN OF INCIPIENT PHTHISIS.

BY

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No argument is necessary to prove that the indications, by which we may hope to detect the commencement of tubercular disease in the lungs, demand our special investigation.

The earliest signs which can be traced by auscultation are, probably, first, the modification of the inspiratory murmur, sometimes denominated jerking, in which the inspiration appears to be effected by a succession of waves; and, secondly, a modification of the expiratory murmur, consisting in an apparent prolongation, and an increase of coarseness. A careful analysis of the cases under my observation illustrating the first of these signs, namely, wavy inspiration (Monthly Journ. of Med., June 1849), has led me, for reasons formerly given, to conclude, that although it may not be a decisive proof of the existence of tubercular disease, yet it probably indicates the presence in the lungs of some deposit of impaired vitality; and is, moreover, a sign of great interest and value, as affording evidence of a condition in which the supervention of phthisis, although happily not certain, is nevertheless too probable, and in which the most vigilant attention is required to avert, by suitable means, a further process of deterioration.

The relation of the second sign, namely, prolonged expiratory murmur, to pulmonary consumption, is much more direct and

significant; and to the investigation of this phenomenon the present brief communication is directed.

In the ordinary healthy state, the expiratory murmur is very slight, and very little more distinct in one part of the chest than in another. In some individuals the murmur is naturally inaudible, excepting, perhaps, during hurried breathing. Laennec observes that it sometimes becomes audible during the existence of pneumonia, and disappears on the resolution of the disease. The probable relation between the exaggeration of this murmur, and the commencement of phthisis, did not escape the attention of that illustrious observer; but he does not appear to have recorded any definite observations on the subject. Andral remarks, in his 'Clinique Médicale,' that the presence of a certain number of tubercles in a portion of lung occasions a diminished intensity of the inspiratory murmur, and a sound louder than usual during expiration. The late Dr. James Jackson, of America, noted the coexistence of prolonged expiration, with diminished softness of the inspiratory murmur, in cases of phthisical or pneumonic condensation; and remarked, that the bronchial character under such circumstances became manifest in the expiration before it could be detected in the inspiration.

Dr. Cowan (London Med. Gaz., vol. xviii, p. 332), in an interesting paper on the subject, endeavoured to give a philosophical explanation of this prolonged murmur; but we are indebted to M. Fournet for the most elaborate attempt to describe the progress of change in the expiratory murmur, and to impress the profession with its importance. The subject, however, does not appear to have obtained the attention which it deserves; and various opinions regarding the value of the symptoms are entertained by authorities in auscultation. It has, therefore, appeared to me desirable to review the cases in which I have noted this altered murmur, in the hope of accomplishing my share in the important task of determining its significancy and value. It may be well to premise, that I agree with Dr. Walshe, in considering the duration of the natural expiratory sound equal to about the fourth of that of the inspiratory. Fournet considered it as

only a fifth; but in the cases investigated with a view to this communication, I have not recorded the expiratory murmur as abnormal, unless it were equal in duration to at least one third of the inspiratory murmur. It is important not to confound the inspiratory and expiratory movements with the inspiratory and expiratory murmurs. The duration of the two movements is *nearly*, perhaps *exactly*, equal. In the natural state, the inspiratory murmur occupies the whole time of inspiration; but the expiratory murmur, at least, to ordinary ears, only a fourth of the time of expiration, the remaining part of the expiratory movement being accomplished in silence. I believe the expiratory murmur follows the inspiratory immediately without a pause. With the progress of phthisis, the duration of the inspiratory murmur usually lessens materially, though not necessarily, in proportion to the prolongation of the expiratory; and some practice is necessary, in order to acquire an aptitude in determining how much of the alteration depends on diminution of the duration of the inspiratory murmur, and how much on extension of the expiratory; but I have found great assistance, in estimating the relative duration of these sounds, from the plan suggested to me by Dr. Sibson, namely, that of counting the number of strokes which can be given by beating time with the finger during the presence of each murmur respectively. The expiratory murmur, as disease advances, may gradually increase until its duration exceeds that of the inspiratory. In proportion to its prolongation it usually becomes increasingly coarse in quality, and at last decidedly bronchial. A change of character probably accompanies the prolongation from its commencement, but is at first too slight to be positively appreciated. The natural elasticity of the lungs is essential to soft and uniform expiration.

Wherever there is considerable consolidation from tubercular or pneumonic deposit, undoubted bronchial expiration is induced; but between the healthy state and decided consolidation, there are various intermediate conditions. When the walls of the pulmonary cells are only slightly thickened, and the neighbouring structure is becoming occupied with

the glairy grayish deposit, studded with little bright cells, which the microscope teaches us to regard, as characterising early phthisis; diminished contractility of the cells, interrupted passage of air, and an increased power of conducting sound, must combine their influence in rendering the expiration murmur more durable, coarse, and audible. Such an explanation is in harmony with the production of similar changes in the murmur, when the pulmonary structure is becoming dense from pneumonia, and when the passage of air is obstructed by the secretion in bronchitis.

The object of this communication being mainly to determine the value of the size in question, as preceding other indications of incipient phthisis, I have excluded in-patients of the Hospital for Consumption, in whom the disease is usually far advanced, from the analysis, confining my researches to the out-patients, and chiefly to those in whom prolonged expiratory murmur was noted as the most prominent of the physical signs. This proves to have been the case in about a sixth of the whole number of consumptive patients submitted to this inquiry. I have recorded it as a principal symptom in 308 patients, of whom 195 were men, and 113 women. The number of women presenting the sign being slightly less than the general proportion of females to males in the list of patients. From the 308 I withdraw twenty, in whom bronchial disease coexisted. In the remaining 288, I observed it almost invariably near the summits of the lungs, where tubercular disease is confessedly most frequent. In 108 the prolonged expiratory murmur was observed only on the right side; in fifty-six on the left. In 124 it existed on both sides, or at least is not specified as confined to either. In this observation, a singular contrast is presented to wavy inspiration, the frequency of which I have observed to preponderate most remarkably in the left side. As commonly occurs in the out-patient department of hospitals, many ceased to attend without reporting the results of treatment, some became decidedly worse, with conclusive signs of rapid progressive tubercular disease; a few gained flesh and strength,

and improved in their general health, chiefly under the use of cod-liver oil; but, with the exception of those patients who were affected with bronchitis, and two or three others entered as cases of congestion of the lungs, in whom, after cupping and other appropriate treatment, the expiratory murmur resumed its natural character, it is remarkable, that I have not recorded any instance in which this sign, after being fully established, ever ceased to be obvious; whilst, in some individuals the duration of the murmur gradually increased, notwithstanding a decided improvement in the constitutional symptoms; and occasionally, at no distant period, a relapse afforded affecting testimony to the accuracy of the first unfavorable prognosis. In a considerable number of the patients, no specific complaint was made, except of debility. In various instances, there were other indications of the existence of phthisis more or less advanced; such for example, as dull resonance on percussion, bronchophony, partial flattening, cough, hurried breathing, quick pulse, emaciation, night perspirations; but, of single special symptoms, the most frequent accompaniment was hæmoptysis, which occurred in 91 cases out of the 288, that is, in more than 31 per cent.

Among our consumptive hospital patients, taken indiscriminately, hæmoptysis, has been noticed in about 64 per cent. If we deduct about a third, in whom there was reason to conclude, that hæmoptysis did not occur till after softening had taken place, the average number of out-patients assumed to have this symptom in the first stage would be about 43 per cent. Whilst, therefore, on the one hand, the coexistence of hæmoptysis in patients with prolonged expiration is sufficiently frequent to strengthen the supposition, that there is an essential connection between this altered murmur and phthisis; on the other hand, the frequency of hæmoptysis in these cases is so much below its average in consumptive patients generally, that when viewed in connection with the frequently trivial character of accompanying symptoms, we feel justified in drawing two important conclusions, namely, first that the prolonged expiratory murmur

takes precedence of other characteristic signs, and secondly, that hæmopytsis more frequently follows than precedes the deposit of tubercle.

Dr. Bowditch observes (Memoir of Dr. Jackson, p. 345), "Every one can decide whether there exists a lengthened expiration, when he cannot tell whether it is bronchial or not . . . . . A question has lately been raised in relation to this interesting subject of this nature, namely, whether there be not often a prolonged expiration at the top of the right shoulder, and none at the left, and this without any disease? I do not know that this has been proved, and there is a great difference between opinion and proof. At any rate, the subject is too important not to excite every one who desires our knowledge of the early stages of phthisis to be advanced: for it is in these early stages that we must hope to be able to do something towards preventing its rapid progress."

The facts in my possession may, I think, assist in determining this question. We agree that the relative frequency of hæmoptysis, in a given class of cases of pulmonary disorder, is a fair element for calculating the degree of probability of the existence of a relation, between the conditions presented by that class and tubercular deposit. Now, of the cases referred to in this paper, taken without reference to hæmoptysis, 108 are specified as having prolonged expiration on the right side only, 56 on the left side only. If the peculiarity in question often occurs on the right side, as a natural phenomenon, independently of disease, it would follow, that the proportion of cases in which hæmoptysis occurs would be greater amongst those patients in whom the prolonged murmur is observed on the left side, than amongst those presenting it on the right; but it is an interesting fact, that no such discrepancy exists. In the patients affected with hæmoptysis, in whom the altered murmur is noted as confined to one side, it was observed 39 times on the right, and 19 times on the left; a proportion so nearly corresponding to the relative frequency of the sign on the two sides, irrespective of spitting of blood, as decidedly to negative the surmise in question.

A disturbed rhythm of murmurs, when established, I believe to be an unnatural condition, and the greater frequency of its detection on the right side may, I conceive, be readily explained; for if the respiratory sounds be naturally rather louder on the right side, the more delicate indications of pulmonary obstruction should first be detected in that direction. It would follow, that in doubtful cases of apprehended phthisis, the absence of any change in the expiratory murmur, at the upper part of the right lung, would be a strong presumptive evidence of freedom from the disease.

It is true, that in certain individuals some degree of febrile action attends tubercular cachexy before any local signs exist of tubercular deposit; but it has repeatedly occurred to me, when hereditary phthisis has manifested itself in a family, to be able, on examining the respiration of the surviving members, to prognosticate the approach of phthisis from this sign alone, in the absence of any other suspicious circumstance, either local or general. When the expiratory murmur is altered, in consequence of emphysema or bronchitis, the extensive diffusion of the sign, and the other concomitant circumstances, will usually suggest a correct interpretation; and if we are careful to separate these sources of fallacy, I cannot but believe, that the sign under review will prove no useless refinement; but one well deserving of careful attention, being the most early, significant, and conclusive of the evidences of incipient phthisis.

It is no valid objection, that the detection of the symptom requires close attention, since the object is to trace the first appreciable inroads of an insidious disease.

When the prolonged expiratory murmur is heard extensively, or on both sides, unassociated with bronchitis or emphysema, there is great reason to fear, not only that the disease is phthisical, but that it will make rapid progress. When the change of murmur is limited to a small portion of lung, and the general condition of the patient is favorable, the evidence of phthisical disease is fully as conclusive; but there is ground to hope that, by careful regulation of diet, by securing exercise in the open air, by promoting healthy nutrition,

and administering suitable remedies, such as iodine, iron, solution of potash, and cod-liver oil, more decided mischief may for a time be averted. I have reason to think, that under such circumstances, some years may occasionally elapse before softening takes place; and I cannot but believe, that when this particular sign under consideration is more generally sought for in suspicious cases of phthisical tendency, the average duration of pulmonary consumption, in persons possessing means to avail themselves of necessary comforts, will be found considerably to exceed the period commonly assumed.

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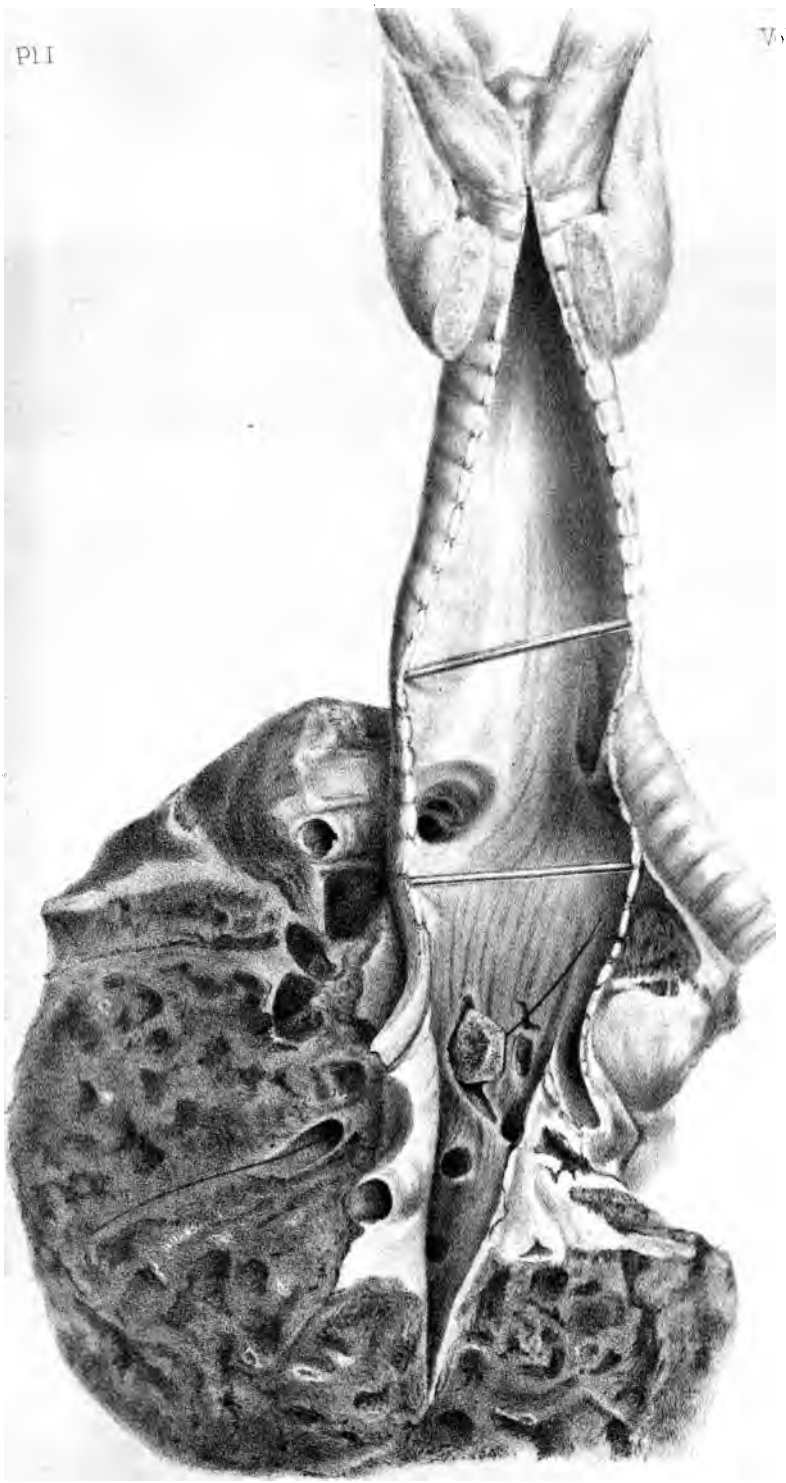


Fig 1

Muscular fibre of the healthy human heart. (400)

Fig 2

Fatty degeneration of the fibres of the human heart. (400)

Fig 3

Fatty Degeneration of the fibres of the human heart. (450)
a. Early stage. b. More advanced.

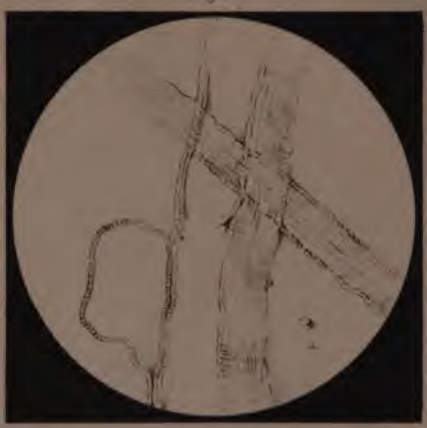
Fig 4

Fatty growth amongst the fibres of the human heart. (400)
a. Fat cells. b. Muscular fibres.

Fig. 1

Extreme Fatty degeneration of the fibres of the heart. (700)

Fig 2



Human Muscular fibre (450) healthy

Fig 3

Human Muscular fibre (450) in a state of "fatty degeneration."

Fig 4

The same, (as 3) after the action of Sulphuric Ether

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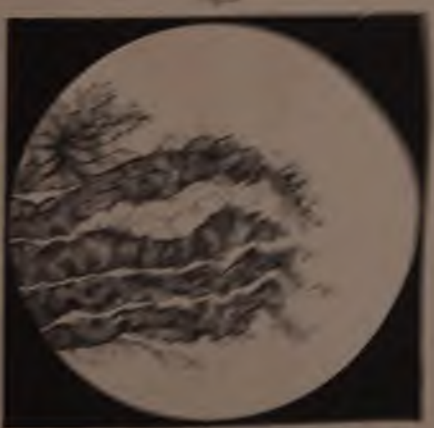

Pl VI

Fig 1

Fig 1, shews fatty growth on and amongst the muscular fibres of the right ventricle of the heart

Fig 2
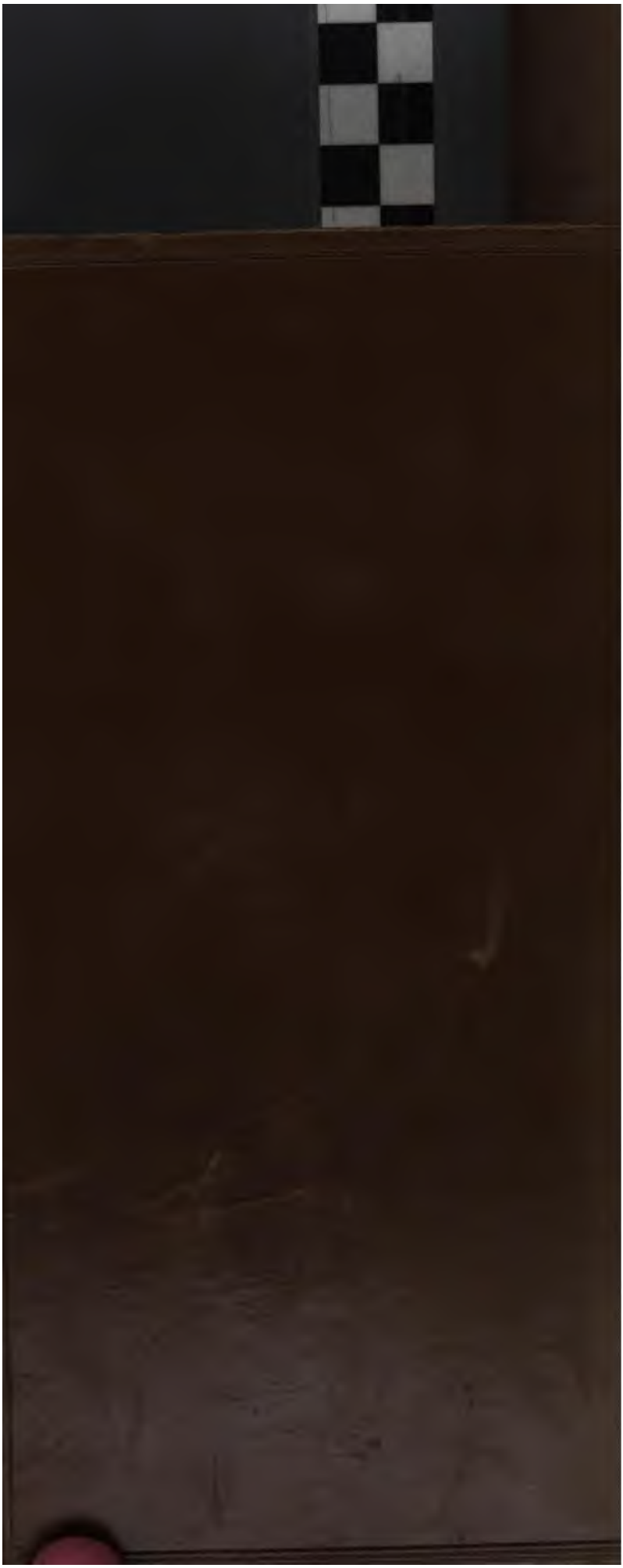
Fig 2, shews fatty degeneration of the muscular fibres of the left ventricle of the heart.